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PROJECT COMPLETION REPORT

BRAZIL

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC PROJECT

(LOAN 923-BR)

March 14, 1986

Latin America and the Caribbean
Regional Office

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Office of Director-General
Operations Evaluation

March 14, 1986

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Project Completion Report: Brazil - Furnas Centrais
Eletricas, S.A. (FURNAS) Itumbiara Hydroelectric Project
(Loan 923-BR)

Attached, for information, is a copy of a report entitled "Project Completion Report: Brazil - Furnas Centrais Eletricas, S.A. (FURNAS) Itumbiara Hydroelectric Project (Loan 923-BR)" prepared by the Latin America and the Caribbean Regional Office. Under the modified system for project performance auditing, further evaluation of this project by the Operations Evaluation Department has not been made.

A handwritten signature in black ink, appearing to be 'P. Hays', is written over a large, faint, stylized 'X' or 'Z' mark.

Attachment

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PROJECT COMPLETION REPORT

BRAZIL

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC POWER PROJECT (923-BR)

Preface

This is the Project Completion Report (PCR) for the Itumbiara Hydroelectric Project, which was partially financed with the proceeds of Loan 923-BR (US\$125.0 million equivalent). The borrower was Furnas Centrais Eletricas S.A. (FURNAS). The Bank approved the Loan in August 1973 and subsequent execution of the Project occurred on schedule.

The PCR was prepared by the Energy Division of the Latin America and Caribbean Regional Office based on the information in Bank files, on final project data prepared by the borrower, and on discussions with staff of the Bank and the borrower.

In accordance with the revised procedures for project performance audit reporting, this PCR was read by the Operations Evaluations Department (OED) but the project was not audited by OED staff.

Following standard procedures, OED has sent copies of the draft report to the Government and the borrower. The borrower reviewed the PCR and his editorial comments, Attachment 1, have been incorporated into the report.

PROJECT COMPLETION REPORT BASIC DATA SHEETBRAZILFURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)ITUMBIARA HYDROELECTRIC POWER PROJECT (LOAN 923-BR)KEY PROJECT DATA

	<u>Appraisal</u>	<u>Actual</u>
<u>Total Project Cost</u> (excluding finance charges) (US\$ million equivalent)		
Dam & Hydroelectric Station	439.7	716.3
Transmission System	153.5	334.5 1/
Total	593.2	1,050.8
<u>Cost Overrun (or Underrun)(%)</u>	None	77.1
<u>Loan Amount</u> (US\$ million equivalent)		
Disbursed	125.0	125.0
Cancelled	0.0	0.0
Repaid (as of March 31, 1985)	11.4	11.4
Outstanding (as of March 31, 1985)	113.6	87.4 2/
<u>Date Physical Components Completed</u>		
Dam & Hydroelectric Station	12/81	12/81
Transmission System	1977/1982	1977/1982
<u>Time Overrun (or Underrun) (%)</u>		
Dam & Hydroelectric	None	None
Transmission System	None	None
<u>Return on Investment (%)</u>	22.9	9.1 3/
<u>Financial Performance</u>	Expected to earn legal return (10-12%) annually, as provided by Brazilian law	Financial situation weakened even though borrower earned legal return (or better) annually, except in 1978.
<u>Institutional Performance</u>	Excellent	Excellent

- 1/ Actual and forecast costs are not fully comparable due to expansion in scope of transmission component.
- 2/ Difference from appraisal estimate reflects foreign exchange adjustment (US\$26.2 million) favorable to the borrower.
- 3/ Actual return was lower than expected due to deterioration in real level of tariffs and expansion in scope and cost of transmission component.

MISSION DATA

<u>Type of Mission</u>	<u>Month/Year</u>	<u>No. of Weeks</u>	<u>No. of Persons</u>	<u>Staff Weeks</u>	<u>Date of Report</u>
Preappraisal	10/72	1	1	1	10/10/72
Appraisal I	1/73	3	3	9	02/20/73
Appraisal II	5/73	1	1	1	05/29/73
				<u>11</u>	
Supervision I	5-6/74	1	3	3	06/13/74
					07/09/74
Supervision II	11/75	1/2	1	1/2	12/04/74
Supervision III	04/75	1	3	3	05/09/75
Supervision IV	06/75	1/2	2	1	07/14/75
Supervision V	10/76	1/2	1	1/2	11/18/77
Supervision VI	02/77	1	3	3	03/11/77
					05/16/77
Supervision VII	6-7/78	2	1	2	07/13/78
Supervision VIII	1/80	2	1	2	02/20/80
Supervision IX	7/81	1	1	1	08/17/81
Completion	10-11/84	<u>1/</u> 2-1/2	1	<u>2-1/2</u> <u>4/</u>	06/27/85

18-1/2

4/ Mission also used its time to collect data on project completion reports on projects financed by Loans 1300-BR and 1008-BR. A report on the project financed by 1300-BR was issued on June 26, 1985. A report on the project financed by 1008-BR is still being prepared.

OTHER PROJECT DATA

<u>Item</u>	<u>Original</u>	<u>Revision</u>	<u>Actual</u>
First Mention in Files	-	-	02/22/72
FURNAS' Loan Application	-	-	11/17/72 5/
Negotiations	-	-	05/21-23/73
Board Approval	-	-	07/05/73
Loan Agreement Date	-	-	08/01/73
Effectiveness Date	11/07/73	10/30/73	10/30/75
Closing Date	12/31/82	-	12/31/82 6/
Borrower	FURNAS	-	FURNAS
Executing Agency	FURNAS	-	FURNAS
Fiscal Year of			
Executing Agency	Calendar Year	-	Calendar Year
Follow-on Project	-	-	CHESF-FURNAS Power Transmission Project 7/

COUNTRY EXCHANGE RATES

<u>Name of Currency</u>	<u>Cruzeiro (Cr\$)</u>
<u>Exchange Rate</u>	
At appraisal	US\$1.00: Cr\$6.13
Intervening-year Average	US\$1.00: Cr\$129.40
Completion Date (December, 1982)	US\$1.00: Cr\$252.67

5/ Date of transmittal of feasibility and engineering reports by FURNAS.

6/ Date of last disbursement: 10/14/83.

7/ The Borrower for this Project is ELETROBRAS, which will on-lend to FURNAS US\$286.8 million of a loan amounting to US\$400.0 million (Loan 2564-BR) to help finance high priority transmission facilities.

BRAZIL

PROJECT COMPLETION REPORT

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC POWER PROJECT (LOAN 923-BR)

Highlights

1. FURNAS executed on schedule the Project and succeeded in obtaining its primary objective -- providing the least-cost solution to meeting regional demand growth. Through Loan 923-BR, the Bank succeeded in obtaining supplementary objectives: strengthening integrated planning and operation for the system; introducing international competition into the civil works industry in Brazil; and maximizing the amount of parallel financing from bilateral agencies.
2. During the period 1976-1982, the financial performance of FURNAS surpassed that of the sector but the financial performance of the sector declined from its formerly high level in the middle 1970's. This declining sector performance was the central subject of dialogue between Brazilian power authorities and the Bank. To address this situation, the Bank and the Government negotiated in 1981 an agreement on tariff increases for the sector which superseded existing revenues covenants. This agreement represented an easing of revenue targets as compared with those originally covenanted; and was replaced in 1983 by a new agreement which specified rate-of-remuneration targets. The Government complied with the terms of these two agreements.
3. By holding down tariffs, the Government has weakened the sector which was adversely affected by recession and successive devaluation which occurred in recent years. Despite this development, the Brazilian power sector continues to be well managed with a better than average performance in satisfying an extremely rapid market growth and with good investment planning.

BRAZIL

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC PROJECT (LOAN 923-BR)

I. BACKGROUND

1.1 Bank Participation in Sector Financing

1.1.1 Since 1949, the Bank has made 38 loans to the power sector of Brazil, amounting to US\$2.35 billion equivalent. Prior to 1976, most Bank loans helped to finance the construction of hydroelectric plants and associated transmission facilities in the Southeastern and Southern regions.

1.1.2 Since 1976, there has been a reorientation of Bank lending to support distribution projects in all regions of Brazil. In connection with such projects, the Bank has provided the power sector with eleven loans, amounting to US\$1.37 billion, including six loans to Centrais Eletricas Brasileiras, S.A. (ELETROBRAS), amounting to US\$0.87 billion.

1.1.3 The Bank has made six loans to Furnas Centrais Eletricas, S.A. (FURNAS) for US\$396.3 million (Annex 1.1). The first five loans to FURNAS helped to finance hydroelectric plants and /or related transmission facilities forming part of a larger development plan of the Rio Grande basin. All of the projects financed by the first five loans to FURNAS were successfully completed, although with some time and cost overruns. The sixth loan (923-BR, US\$125.0 million) helped to finance the Itumbiara hydroelectric project, which is the subject of this report. FURNAS will also be benefitting from a recently approved loan to ELETROBRAS (2564-BR; US\$400 million), which has committed itself to relending US\$286.8 million to FURNAS to help finance high-priority transmission facilities.

1.2 Sector Organization

1.2.1 As a result of progressive nationalization and growing centralization over the forty years ending in 1974, the Brazilian power sector evolved into a relatively compact structure of federal and state utilities. Decree No. 68,024 of June 7, 1967 established the legal, technical, and administrative structure of the power sector and defined the structure as consisting of the National Department of Water and Electric Energy (DNAEE), ELETROBRAS, and the various federal, state, municipal and private concessionaires, all under the jurisdiction of the Ministry of Mines and Energy (MME).

1.2.2 DNAEE has been performing regulatory functions, including the granting of licenses for hydroelectric sites, assigning concession areas, setting tariffs, and approving sector expansion plans. Since 1981, the

authority of DNAEE to set tariffs and approve expansion plans has been reduced by the effective transfer of final authority to the Secretariat of Planning (SEPLAN), which has been reviewing and approving tariff increases and investment plans within a broader policy context.

1.2.3 ELETROBRAS, a mixed economy corporation, whose principal shareholder is the Government of Brazil, has been operating as an executing agency under the jurisdiction of the MME and in coordination with DNAEE and SEPLAN. ELETROBRAS has been performing the functions of: (a) utility holding company for those power utilities where the Government has acquired financial control; (b) investment banker by administering public funds for use by its subsidiaries and by state power companies; and (c) coordinator of the external borrowing efforts of the individual power companies. ELETROBRAS has also been carrying out a planning function by analyzing the expansion plans of major generation and transmission companies; and an operational co-ordination function through the Co-ordinating Groups for Interconnected Operations (GCOI's). Operating on a regional basis--one for the South-southeast and one for the Northeast--the GCOI's are charged with the responsibility for maximizing economic benefits through the most efficient operation of interconnected generating plants and transmission systems.

1.2.4 At the operating level, the sector consists of federal, state, municipal, and private concessionaires. Since 1974, in accordance with Government policy, construction and operation of major new power generating facilities and related high voltage transmission systems are reserved largely to four ELETROBRAS subsidiaries which cover Brazil's five geo-economic regions. These companies are FURNAS, Centrais Eletricas do Norte do Brasil (ELETRONORTE), Companhia Hidro Eletrica do Sao Francisco (CHESF) and Centrais Eletricas do Sul do Brasil (ELETROSUL). ELETROBRAS also owns the power distributor for the state of Espirito Santo (Espirito Santo Centrais Eletricas, S.A.-ESCELSA) and the distribution company serving the metropolitan area of Rio de Janeiro (LIGHT - Servicos de Eletricidade, S.A.-LIGHT). ELETROBRAS has been investing in distribution companies; but the distribution function is carried out at the state level mainly by utilities controlled by state governments. ELETROBRAS also holds the Brazilian Government's 50% interest in the Itaipu Binational, the binational agency established (1973) by the governments of Brazil and Paraguay to build jointly the 12,600 MW Itaipu hydroelectric facility on the Parana river.

1.3 The Borrower

1.3.1 FURNAS is the largest operating subsidiary of ELETROBRAS, covering the Southeast and part of the Center-west regions. It generates energy primarily from hydroplants constructed on the Rio Grande for bulk delivery to regional electric distributing companies through an extensive high-voltage transmission system.

1.3.2 In terms of sales and capacity additions, the growth of FURNAS has been impressive. In 1964, FURNAS had an installed capacity of 900 MW and sold 3,215 GWh. By 1984, FURNAS had an installed capacity of 7,466 MW and sold 33,375 GWh; it operated 10,711 km of transmission lines (at 138, 230, 345, 500, and 765 kV) and 30 substations with a total transformation capacity of 17,000 MVA.

1.3.3 Of the generation capacity of FURNAS, 6,800 MW is hydroelectric; and 666 MW is oil-fired power plant. A nuclear power generating plant, Angra I, with a capacity of 626 MW, started commercial operation on January 17, 1985. As a result of an international agreement between Brazil and Paraguay, FURNAS is obligated to purchase most (about 85%) of the energy available from the binational authority operating the hydroelectric plant at Itaipu on the Parana River. This agreement stipulates that the allocation of the energy generated at the Itaipu hydroplant will have priority over the allocation of the energy at the existing plants. As a result, the energy purchases of FURNAS, mainly from the Itaipu hydroplant, are expected to grow at an average annual rate of about 61% between 1984 and 1992.

1.3.4 The financial planning, budgeting, and reporting systems of FURNAS are satisfactory. Also satisfactory are the accounting and billing systems and the internal audit group.

II. PROJECT PREPARATION AND APPRAISAL

2.1 Project Origin and Rationale

2.1.1 In 1963-1965, a consortium of Canadian, American, and Brazilian (CANAMBRA) engineering firms identified a series of low-cost hydroelectric sites, including Itumbiara, which would be part of an economic development sequence for meeting the anticipated growth of electricity in the Southeastern region up to 1980. The United Nations Development Program (UNDP) funded the CANAMBRA study; the Bank acted as Executing Agency. Brazilian power authorities followed the recommendations of the CANAMBRA study, including the decision (taken in about 1971) to construct Itumbiara (about 1971), in developing the power potential of the Southeastern and South-Central regions.

2.1.2 According to the CANAMBRA study, the Itumbiara site, located on the Paranaíba River, about 1,200 km northwest of Rio de Janeiro, was suitable for development in conjunction with two other sites, Tupaciguara and Anhanguera. With the assistance of the Brazilian branch of an international engineering firm, FURNAS performed detailed computer studies of the Itumbiara dam height. As a result of these studies, FURNAS took the decision to increase substantially the height of the dam, thereby eliminating the other two planned upstream dams, while increasing the storage capacity of the Itumbiara reservoir four-fold. The decision to increase the height of the dam made possible the installation at Itumbiara of twice the capacity originally envisaged by CANAMBRA.

2.1.3 In June 1972, FURNAS authorities provided Bank staff with cost estimates on the expanded Itumbiara hydroelectric project. In addition to normal economic and technical considerations, the Bank was interested in using the proposed loan (US\$125.0.0 million) as a means to: (i) strengthen the position of ELETROBRAS in the power sector by committing the Government to integrated planning and operation of the power sector; (ii) expose local civil works contractors to international competitive bidding (ICB); and (iii) maximize the amount of parallel foreign financing compatible with the requirements of FURNAS.

2.2 Project Definition and Cost

2.2.1 Bank preparation and appraisal missions (October 1972; January and May 1973) found the Itumbiara project to be suitable for Bank lending. The proposed Project would consist of the following components:

(a) The main dam 7 km long comprising:

- (1) concrete spillway, intake and transition sections involving 2.3 million m³ of concrete work; and

- (ii) earth-fill embankment sections on both banks, involving 30 million m³ of fill, with a maximum height of 106 m;
- (b) a conventional indoor type power station with eight generating units rated at 260 MW each.
- (c) single-circuit 500 kV transmission lines (496 km); a single-circuit 345 kV line to Brasilia from Itumbiara (350 km); and expansion of the 138 kV system in Rio de Janeiro and its extension into the State of Espirito Santo;
- (d) the corresponding 500 kV, 345 kV and 138 kV transformer substations; and
- (e) expansion of the load dispatch and microwave communications systems.

2.2.2 The 500 kV transmission lines would interconnect Itumbiara with the hydro plants at Sao Simao, Marimbondo, and Agua Vermelha; and would be part of a common 500 kV network linking the three major regional electricity producers ^{1/}, which had agreed that power delivered from the above plants would be transmitted in any direction on their respective portions of the common network without wheeling charges. The common network would have the minimum capital cost of the various alternatives considered.

2.2.3 The transmission lines at 138 kV consisted of: (i) 150 km of double circuit interconnecting the Santa Cruz thermal plant with the Angra nuclear plant and the area of Parati; and (ii) 370 km of double circuit interconnecting Adrianopolis in the Rio area with Cachoeiro do Itapemirim in the state of Espirito Santo.

2.2.4 The proposed dam and hydroelectric station were expected to cost US\$439.7 million (foreign cost: US\$170.5 million). The proposed transmission system was expected to cost US\$153.5 million (foreign cost: US\$49.0 million). The total cost of the Project was expected to amount to US\$593.2 million. Proposed sources of financing included: the loan from the Bank -- US\$125.0 million; parallel financing from bilateral agencies -- US\$76.0 million; and funding from FURNAS (internal cash generation) and ELETROBRAS (equity contributions and loans) -- US\$392.2 million.

2.3 Project Preparation and Appraisal

2.3.1 In addition to defining the cost and components of the proposed Project, Bank preparation and appraisal missions focused on such issues as the identification of project items suitable for Bank financing and suitable for parallel financing, the economic justification of the Project, the effect of geological unknowns on the cost of the dam, and environmental aspects of the Project. Eventually, Bank staff and Brazilian power authorities found solutions to these issues.

^{1/} FURNAS, Centrais Eletricas de Minas Gerais (CEMIG), and Centrais Eletricas de Sao Paulo (CESP).

2.3.2 In connection with the identification of items suitable for Bank financing, and in line with its project objectives (para. 2.1.3), the Bank decided to provide a loan of US\$125 million to finance: (a) part of the foreign cost component (up to US\$60.0 million) of the civil works for the dam and hydro electric station; and (b) a list of equipment (about US\$65.0 million), mostly transmission, not suitable for financing through parallel financing arrangements. The contracts benefitting from Bank financing would be subject to ICB. Disbursements from the proposed Bank loan for civil works contracts would be made against 35% of the amount billed up to US\$60.0 million. Disbursements for the Bank loan for the equipment contracts would be for 100% of the amount billed up to US\$65.0 million. It was expected that the equipment financed under parallel financing arrangements (US\$76.0 million) would be subject to ICB, the Brazilian manufacturers being given the same 15% margin of preference as under the Bank loans. It was also expected that the equipment obtained by parallel financing arrangements would consist of such items as the main generating equipment, power transformers, etc., which were not manufactured or priced competitively in Brazil. FURNAS successfully completed arrangements for parallel financing.

2.3.3 In connection with the economic justification of the Project, the Bank agreed on an exception basis to certain "simplified" economic tests -- namely, the comparison of the proposed hydro project with an equivalent oil-fired thermal plant or nuclear station combined with additional hydroelectric peaking capacity to be installed at existing hydroelectric plants. As compared with five alternative programs, the proposed Itumbiara project was found to be the least-cost solution for all discount rates up to 15%.

2.3.4 Bank agreement to accept the "simplified" economic tests occurred because ELETROBRAS did not provide a least-cost regional justification for the Itumbiara Project. Such a justification had been expected, as the Government had committed itself under the Guarantee Agreement (Section 3.03) for the Sao Simao Project (Loan 829-BR) to "...adopt the South Central Region Generation Development Plan...as the basis for granting concessions for, and authorizing investments in, generation facilities in the South Central Region". Instead of providing the expected justification, ELETROBRAS presented an energy balance study which merely verified that the non-integrated, individual expansion plans of FURNAS, CEMIG and CESP would meet the energy requirements of the region for the period 1972-1985. To reinforce the commitment of the Government to seek least-cost regional solutions, the Bank, during negotiations, persuaded the Government to prepare a proper development plan for both generation and transmission expansion by November 1, 1983.

2.3.5 Because of incomplete geological investigations, the cost of foundation excavation for the clay embankments represented a major unknown. Except for the concrete spillway and powerhouse intake, which were founded on good rock, the geology of the dam site, especially the geology underlying the

proposed embankments, consisted of highly compressible over-burden which was suspected of varying from 2 meters to more than 30 meters. To prepare a foundation, removal of the over-burden would be necessary; but the full extent of excavation and its associated cost were significant uncertainties. To compensate for the unknowns of excavation, the Bank added a physical contingency allowance of 20% to the original cost of the civil works; but did not fully explain the basis for such a contingency level. It was recognized implicitly by Bank staff that the cost of the Project would probably be subject to upward revision as more information became available on the geology of the dam site.

2.3.6 At the suggestion of the Bank, a consultant studied the environmental aspects of the Project. Because of the remoteness of the Project site and the low population density in the vicinity, the consultant found that the impact of the Project would be relatively small. During negotiations, FURNAS agreed to provide the Bank by June 30, 1974 a satisfactory resettlement plan for the population displaced by the Project; and to implement such plan in a manner satisfactory to the Bank.

2.4 Negotiations, Board Approval, Loan Signing and Effectiveness

2.4.1 No major problems delayed negotiations (May 21-23, 1973), Board approval (July 5, 1973), loan signing (August 1, 1973), or effectiveness of the Loan Agreement (October 30, 1973). Loan 923-BR amounted to US\$125.0 million; the term was 30 years, including a grace period of seven years. The interest rate was 7.25% per year; the commitment fee, 3/4 of 1%.

2.5 Major Covenants of the Loan and Guarantee Agreements

2.5.1 Annex 2.1 sets forth major covenants of the Loan and Guarantee Agreements. With respect to the Itumbiara Loan, FURNAS and Government authorities complied with their respective major covenants including those in the areas of tariffs and revenues.

III. PROJECT EXECUTION AND COST

3.1 Actual and Forecast Data on Project Execution and Cost

3.1.1 The Project had two major parts: the dam and hydroelectric station; and the transmission system. The project also included expansion of the load dispatch and microwave communications systems. Concerning the dam and hydroelectric station, Annexes 3.1 and 3.2 set forth actual and forecast completion dates and data on quantities of material (excavation, concrete, fill, etc.). With respect to the transmission facilities, Annexes 3.3 and 3.4 set forth actual and forecast completed transmission lines and substations, together with their corresponding completion dates. Annexes 3.5 and 3.6 compare actual and forecast project costs in current and constant prices. Annexes 3.7 and 3.8 compare actual and forecast data for allocation of the proceeds of the loan and cumulative disbursements, respectively. Annex 3.9 sets forth price deflator indices used to convert cost data from current prices into constant prices (May 1973). The following paragraphs discuss the information contained in the annexes.

3.2 Timetable, Changes, and Supervision

3.2.1 The dam and hydroelectric station were completed on time; actual quantities of material (excavation, concrete, fill, etc.) were 13% greater than expected (Annexes 3.1 and 3.2).

3.2.2 The transmission portion of the Project consisted of the "Itumbiara System" (a network of transmission lines at 500 kV plus corresponding substations) and reinforcement of the 138 kV transmission lines in the states of Espirito Santo, plus corresponding substations (paras. 2.2.1 - .2). Except for deletion of the Sao Simao-Marimbondo line, to which the Bank agreed, FURNAS completed construction of the lines and substations of the "Itumbiara System" on time and essentially without major change. To meet the evolving supply requirements of the system, FURNAS expanded the substation component beyond that originally foreseen at appraisal by adding such items as transmission line bays, transformers, and reactors. The additional items increased the cost of the Project but did not represent a change to the Project requiring Bank agreement (Annexes 3.3 and 3.4).

3.2.3 In 1974, to take account of changing market demands in the states of Rio de Janeiro and Espirito Santo, FURNAS proposed the substitution of two single-circuit 345 kV lines (Adrianopolis-Rocha Leao-Campos-Cach. do Itapemirim-Vitoria) for two double-circuit 138 kV transmission lines extending only to Cach. do Itapemirim; and the addition of a 138 kV transmission line between Cach. do Itapemirim and Vitoria. FURNAS also proposed changes to the corresponding substations. The Bank agreed to these and later changes proposed by FURNAS. Construction of the transmission

reinforcement was completed in 1977 and 1978 (Annexes 3.3 and 3.4). As completed, the scope of the transmission reinforcement was larger than what was expected at appraisal. FURNAS also completed expansion of its load dispatch and microwave communications systems.

3.2.4 Bank missions supervised the Project annually between 1974 and 1981. They found no major technical problems requiring special attention on their part.

3.3 Project Cost

3.3.1 In current prices, the cost of the dam and the hydroelectric station amounted to US\$716.3 million, 62.9% more than the appraisal forecast; and the cost of the transmission component amounted to US\$334.5 million, 117.9% more than the appraisal forecast. The total cost of the Project amounted to US\$1,050.8 million (Annex 3.5), funding for which was provided by the Bank (US\$125.0 million), FURNAS and ELETROBRAS (US\$759.1 million), Brazilian development institutions (US\$133.0 million), a Brazilian commercial bank (US\$0.8 million) and foreign commercial banks and bilateral agencies (US\$32.9 million).

3.3.2 In 1973 constant prices, the cost of the dam and the hydroelectric station amounted to US\$483.3 million, 20.3% more than the appraisal forecast. The cost of the transmission component amounted to US\$237.9 million, or 75.6% more than expected at appraisal (Annex 3.6).

3.3.3 With respect to the dam and hydroelectric station, the cost increase (US\$81.6 million), as measured in constant 1979 prices, was concentrated in local currency purchases and had its origin in the following: (i) land values were US\$15.9 million more than expected because of the recent (and therefore unexpected) migration of large commercial farming operations to the vicinity of the Itumbiara reservoir; (ii) civil works expenditures were US\$34.0 million more than expected due, inter alia, to larger-than-expected quantities of material; (iii) equipment costs were US\$7.9 million more than expected, reflecting the renegotiation of equipment contracts placed with local manufacturers following Government withdrawal of fiscal incentives; and (iv) engineering/administration costs were US\$23.8 million higher than expected, reflecting, inter alia, the higher cost of civil works. However, as a percentage of the total project costs, the cost of engineering/administration was only slightly larger than the upper end of the range normal to such costs: 19.3% vs. 18.0%.

3.3.4 With respect to the transmission component, the cost increase (US\$102.4 million), as measured in constant prices, was concentrated in local currency purchases and had its origin in: (i) the addition of equipment to the "Itumbiara System" (para. 3.2.2); (ii) expansion of the scope of the reinforcement of the transmission system in the states of Rio de Janeiro and Espirito Santo (para. 3.2.3); and (iii) rising equipment costs due to the

renegotiation of contracts following Government withdrawal of fiscal incentives. The rising equipment costs contradicted appraisal expectations with respect to the placing of equipment orders outside of Brazil and sources of financing (para. 2.3.2).

3.3.5 At appraisal, Bank and FURNAS staff expected that bilateral agencies would provide about US\$76.0 million under parallel financing arrangements to fund the cost of equipment, both transmission and generation, either not manufactured or not sold at competitive prices by national manufacturers. To encourage bidding by national manufacturers, FURNAS agreed that equipment would be purchased under ICB with a 15% margin of preference to be offered to national manufacturers. The Government also provided fiscal incentives to local manufacturers. In these circumstances, with local manufacturers winning a substantial number of contracts and enjoying financing from Brazilian development institutions, bilateral and Bank financing for equipment amounted to only US\$32.9 million and US\$52.1 million, respectively, as compared with total equipment costs of US\$453.6 million (in current prices).

3.3.6 After the contracts for the supply of equipment were awarded, the Government withdrew the fiscal incentives, thereby forcing FURNAS and the national manufacturers to negotiate new contracts at higher prices. If FURNAS had attempted to enforce the original contract, according to FURNAS staff, there would have been substantial litigation, resulting in delay to the Project.

3.4 Allocation of Loan Proceeds and Timing of Disbursements

3.4.1 Changes in the expected pattern of financing (para. 3.3.3), together with increased costs for civil works of the dam and hydroelectric station, led FURNAS to seek, and the Bank to agree, to a reallocation of loan proceeds to finance a larger portion of civil works than expected at appraisal (Annex 3.7). Initial construction delays led to corresponding delays for disbursements; but these delays were not serious (Annex 3.8).

3.5 Integrated Planning and Operation of the Power Sector; Environmental Impact of the Project

3.5.1 The Government equipped ELETROBRAS with the legal authority and technical capacity to carry out expansion planning for major generation and transmission companies (para. 2.1.3). The Bank reviewed and accepted in 1975 the expansion program for the Southern and Southeastern regions. While late in preparation, this program satisfied the requirements of Section 3.03 of the Guarantee Agreement. The Bank is satisfied with the planning performance of ELETROBRAS, which has developed high quality and technically advanced planning models.

3.5.2 The Bank was satisfied with the performance of FURNAS with respect to covenanted environmental obligations (Section 3.07 of the Loan Agreement). FURNAS prepared and executed a resettlement plan for the population displaced by the formation of the Itumbiara reservoir.

IV. PROJECT JUSTIFICATION

4.1 Actual and Forecast Data on Justification of the Project

4.1.1 Annexes 4.1 and 4.2 compare, respectively, the actual and forecast energy and power balances for the Southeast region and the market forecast of the FURNAS system. Annex 4.3 sets forth the return on actual investment in the Itumbiara Project.

4.2 Project and Loan Objectives

4.2.1 The main objective of the Itumbiara project was to provide FURNAS with the least-cost solution for meeting the expected demand for power in the Southeastern region. The Bank was interested in using the loan for supplementary objectives -- namely, to strengthen sector planning and operations, to introduce international competition into the national civil works industry, and to maximize parallel financing from bilateral agencies (para. 2.1.3). The Project and the loan were successful in meeting their respective objectives. The Itumbiara hydroelectric project was successfully executed and is making a significant contributions to the supply of energy generated by FURNAS. The Itumbiara plant supplied about 26% of the total generation of FURNAS in 1983. Brazilian power authorities strengthened sector planning and operation through ELETROBRAS (para. 3.5.1). The national civil works contractors were subject to foreign competition (para. 3.2.1). The level of parallel financing from bilateral agencies did not conform to Bank expectations (para. 3.3.5) but was, nonetheless, satisfactory for meeting the needs of FURNAS with respect to the Project.

4.3 Market Growth, 1971-1982

4.3.1 Aggregate actual and forecast regional sales levels were close: 746,160 GWh vs. 735,375 GWh, a difference of only 1.5% (Annex 4.1). The regional power market grew about as expected, even though it reflected the effect of factors not anticipated at appraisal, such as the development of the metallurgical industry in Espirito Santo. Other unexpected factors included the petroleum crisis (1972-1976), the substitution of electrical energy for petroleum (1977-1980), and major economic problems (1981-1982). During the years 1981 and 1982, years of macroeconomic difficulty for Brazil, regional sales levels were modestly less than expected (-1.65% and -6.46%, respectively). The modest regional shortfalls involved larger shortfall for FURNAS.

4.3.2 For the period 1971-1982, the actual aggregate level of FURNAS sales (27,230 MW) was less than the forecast level (29,747 MW) (Annex 4.2). Most of the shortfall occurred during the years 1981-1982; but the shortfall did not jeopardize the economic justification of the Project, as regional electricity demand has since resumed growth at a high level.

4.4 Least-Cost Justification

4.4.1 The appraisal report compared Itumbiara and Agua Vermelha (to be built by a state power company) against various thermal (oil-fired or nuclear) alternatives (para. 2.2.3) and found Itumbiara to be part of the least-cost expansion program. There is no evidence to suggest that the project as completed was not part of the least-cost solution.

4.4.2 At appraisal, the cost of the Marimbondo plant was US\$192/kW (in constant 1973 prices) compared with the then prevailing cost range of the average hydro plant in other regions of Brazil, US\$485-777. The actual per-kW cost was about US\$232 (in 1973 prices), an increase of 20.3%. The actual per-kW price remained well below the range of costs prevailing at the time of appraisal. In spite of the increase in plant cost, Itumbiara remains the least-cost solution when compared with an oil-fired thermal plant, as the investment costs of the latter would have been no less than US\$232/kW (in constant 1973 prices) and the operating costs of a thermal plant would reflect fuel expenditures which have increased substantially since 1973.

4.5 Internal Rate of Return

4.5.1 The appraisal report indicated an internal rate of return on investment of 22.9%. On the basis of actual investment costs, actual and expected tariff levels, and actual and expected operating costs (in constant 1973 prices), a similar analysis shows a return of 9.1%. This low return reflects the deterioration of the real level of tariffs which occurred in recent years since tariffs are used as a proxy measure of benefits. The lower rate of return also reflects the expansion of the scope and cost of the distribution portion of the Project.

V. FINANCIAL PERFORMANCE

5.1 Actual and Forecast Financial Data, 1973-1982

5.1.1 Annex 5.1 sets forth actual and forecast key financial ratios of FURNAS for the years 1973-1982. Annex 5.1 also sets forth the corresponding financial ratios of the sector. Comparison of the actual ratios of FURNAS and the sector on a year-by-year basis shows that the financial performances of FURNAS and the sector were close -- that is, the financial performance of FURNAS exhibited decline after 1978 while still modestly surpassing the financial performance of the sector. In addition to slowing sales growth, the declining financial performances of FURNAS and the sector were primarily due to the reduction in the real level of tariffs, which reflected the effort of the Government to control inflation.

5.1.2 Annexes 5.2 to 5.4 compare actual and forecast income statements, sources and applications of funds, and balance sheets for the years 1973-1982. Annexes 5.5 and 5.6 set forth actual data for sources and applications of funds, and cost of service and remuneration for the sector for the years 1973-1982. The following paragraphs discuss the information shown in the annexes in the context of Government policies for the power sector.

5.2 Government Tariff and Financing Policies for the Sector 1964-1982; Revenue Covenants; and Tariff Agreements of the Early 1980's.

5.2.1 Under the present sector organization (paras. 1.2.1 to 1.2.4), the Government takes the most significant financial decisions, particularly with respect to the setting of tariff levels, with little participation on the part of the state governments and power utilities. As an understanding of Government policy with respect to tariffs and financing for the power sector is fundamental to an understanding of the financial performance of the individual power utilities, the following sets forth a brief description of Government policy over the last twenty years. There is also a discussion of the various revenue agreements negotiated by Brazilian power authorities with the Bank since 1980.

5.2.2 In the early 1960's, by establishing ELETROBRAS, and later in the early 1970's, by delineating the responsibilities of the Federal and State operating companies, the Government created a new structure for sector organization to make the power sector an important contributing factor to the economic development of Brazil. To provide adequate levels of funding for the sector investment program, the Government contributed high levels of equity funding and set tariffs at realistic levels -- that is, at levels sufficient to earn the legal rate of remuneration (10-12%) on annually revalued remunerable assets.

5.2.3 As a result of these tariff policies, the contribution of consumer based funding to the growing investment program increased steadily throughout the mid 1970's, at which time the sector reached a peak of financial soundness. In 1973, the net (after debt service) consumer-based funding amounted to 56% of the sector funding mix whereas borrowing had a share of only 30%. Equity contribution composed the balance of the funding mix.

5.2.4 The oil crisis of the mid 1970's created a new set of financial conditions for the power sector: (i) inflation affected substantially the unit costs of the investment program of the sector; and (ii) the Government's fight against inflation resulted in a deterioration of real tariff levels and of the consumer-based contribution to the investment program. As a consequence of these conditions, the sector became increasingly dependent on borrowings, resulting in a heavy debt service burden in the late 1970's and early 1980's.

5.2.5 Section 5.06 of the Loan Agreement and Section 3.02 of the Guarantee Agreement for Loan 923-BR required, respectively: (i) FURNAS to take all action necessary for tariffs to be set at levels to produce revenues as provided by Brazilian law; and (ii) the Government to take all reasonable action necessary to enable FURNAS to comply with obligations contained in the Loan Agreement. Brazilian law called for a return of 10-12% on remunerable assets, which level the sector failed to earn subsequent to 1978. For the period 1973-1982, the compliance of FURNAS with the revenue covenant was satisfactory. The following table compares the actual rates of remuneration of the sector and FURNAS for selected years.

Rates of Remuneration (%) 1976-1981

	<u>1974</u>	<u>1976</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Sector	10.4	11.4	8.6	7.7	4.9	7.9	7.3
FURNAS	14.2	13.5	9.7	10.3	10.9	10.4	10.7

5.2.6 In 1980, having experienced increasingly disappointing results in obtaining compliance on the part of the power sector with existing revenue covenants, the Bank reached an understanding whereby the Government would increase tariff levels to achieve a rate of remuneration of 10% in 1981 and future years and the recovery of revenue shortfalls of prior years over a three-year period. The table above shows a substantial improvement in the rate of remuneration of the sector in 1981, as compared with the previous year, but a rate of remuneration which still fell short of the level agreed in 1980. In 1981, sales growth declined as compared with prior years because of macroeconomic conditions, consideration of which further inhibited the Government from raising power tariffs sufficiently to earn a return of 10%.

This unwillingness to raise tariff levels led to additional discussions with the Bank and the formulation of a new revenue agreement.

5.2.7 In October 1981, the Bank and the Government agreed that the latter would increase tariff levels by 3% in real terms in 1982 and 5% annually thereafter, until the sector achieved a 10% rate of remuneration and past shortfalls were recovered. Having accepted this new approach, the Bank formally agreed not to require compliance on the part of Brazilian power borrowers with existing revenue covenants. In November 1983, this approach was amended: both parties agreed on a program of tariff action and other measures to increase the sector rate of remuneration by one percentage point each year until 1989, when the sector should earn a return of 10%. The various agreements referred to above did not lead to an amendment of the revenue covenants of FURNAS, under Loan 923-BR. Rather, the Bank committed itself not to seek enforcement of these covenants as long as tariff levels were increased as agreed.

5.2.8 The successive revenue agreements after 1980 reflected the efforts on the part of the Bank and Brazilian power authorities to establish tariff levels under adverse and trying circumstances. With respect to the most recently established revenue agreement (1983), the financial performance of the sector in 1984 has been satisfactory; but the restoration of sector finances will not be achieved in the near term.

5.2.9 The following paragraphs discuss the financial performance of FURNAS.

5.3 Sales, Tariff Levels, and Finances, 1973-1982

5.3.1 The table below summarizes on an aggregate basis the financial performance of FURNAS for the period 1973-1982, the period of project implementation originally expected at appraisal.

ACTUAL AND FORECAST SUMMARY OPERATING RESULTS AND SOURCES AND APPLICATION OF FUNDS, 1973-1982
(in millions of Cr\$, stated in prices as of May 1973)

	<u>Actual</u>	<u>Percent(%) of Total</u>	<u>Appraisal Forecast</u>	<u>Percent(%) of Total</u>	<u>Difference from Appraisal Forecast</u>	
					<u>Amount</u>	<u>Percent(%)</u>
Sales (in GWh)	216,872	Not Appli- cable(NA)	238,065	NA	(21,193)	(8.9)
Average revenue per KWh (in Cr\$)	0.075	NA	0.113	NA	(0.038)	(33.6)
Revenues	16,292.7	100.0	26,809.8	100.0	(10,517.1)	(39.2)
Operating Expenses	<u>9,576.0</u>	<u>58.8</u>	<u>14,640.1</u>	<u>54.6</u>	<u>(5,064.1)</u>	<u>(34.6)</u>
Depreciation	<u>2,222.7</u>	<u>13.7</u>	<u>4,017.9</u>	<u>15.0</u>	<u>(1,795.2)</u>	<u>(44.7)</u>
Amortization	246.2	1.5	-	-	246.2	NA
Other	7,107.1	43.6	10,622.2	39.6	3,515.1	(33.1)
Net operating income	6,716.7	41.2	12,169.7	45.4	(5,453.0)	(44.8)
Other income	554.9	3.4	14.6	0.0 a/	540.3	Not Mean- ingful(NM)
Net income before interest	7,271.6	44.6	12,184.3	45.4	(4,912.7)	(40.3)
<u>Sources of Funds</u>						
Gross internal cash generation	9,740.5	40.6	16,202.2	98.3	(6,461.7)	(39.9)
Net income before interest	<u>7,271.6</u>	<u>30.3</u>	<u>12,184.3</u>	<u>73.9</u>	<u>(4,912.7)</u>	<u>(40.3)</u>
Depreciation	2,222.7	9.3	4,017.9	24.4	(1,795.2)	(44.7)
Amortization	246.2	1.0	-	-	246.2	NM
Debt service	7,936.1	33.1	9,592.5	36.2	(1,656.4)	(17.3)
Net internal cash generation	1,804.4	7.7	6,609.7	40.1	(4,805.3)	(72.7)
Borrowings	21,726.6	90.6	9,641.4	58.5	12,085.2	125.3
Share capital	459.1	1.7	234.8	1.4	224.3	95.5
Total sources	<u>23,990.1</u>	<u>100.0</u>	<u>16,485.9</u>	<u>100.0</u>	<u>7,504.2</u>	<u>(45.5)</u>
<u>Application of Funds</u>						
Construction program	23,389.1	97.5	12,170.9	73.8	11,218.2	92.2
Dividends and other	1,981.7	8.3	4,108.8	24.9	(2,127.1)	(51.8)
Net change in working capital	<u>(1,380.7)</u>	<u>(5.8)</u>	<u>206.2</u>	<u>1.3</u>	<u>(1,586.9)</u>	<u>NM</u>
Total applications	<u>23,990.1</u>	<u>100.0</u>	<u>16,485.9</u>	<u>100.0</u>	<u>7,504.2</u>	<u>(45.5)</u>

a/ Less than 0.1%.

5.3.2 The table above shows that actual aggregate sales (216,872 GWh) were 8.9% less than the level (238,065) GWh expected at appraisal. The shortfall of actual sales was due to lower market growth and macroeconomic problems in 1980-1982. In other respects, the actual and forecast operating results (such as revenues and expenses) of FURNAS are not close. For example, actual average revenue per kWh sold declined from Cr\$0.089 in 1973 to Cr\$0.067 in 1982 while average operating expense per kWh sold remained close to the level of Cr\$0.018 throughout the period. In contrast, the appraisal forecast reflected the expectation that average revenue per kWh sold would decline from Cr\$0.110 in 1973 to Cr\$0.095 in 1982 (with the average level at Cr\$0.113) while average operating costs per kWh sold would decline from an expected level of Cr\$0.034 in 1973 to Cr\$0.015 in 1982 (Annex 5.1). Staff of the Bank and FURNAS could not explain the discrepancy between appraisal forecast and actual operating costs.

5.3.3 The actual level of investment expenditures (Cr\$23,389.1 million) was substantially greater (92.2%) than that which was expected at appraisal due to cost increases, especially with respect to the Angra nuclear program. The Bank was aware of a nuclear program as early as 1969, accepted the financing plan proposed for the over-all FURNAS expansion plan in 1972 (including the nuclear program), and agreed with expansion program for the Southern and Southeastern regions in 1975 (para. 3.5.1), which included the nuclear program.

VI. INSTITUTIONAL PERFORMANCE

6.1 The Government and the Borrower

6.1.1 FURNAS is the largest of the ELETROBRAS subsidiaries. It enjoys a history of good management and organization. With respect to the Project, its performance was fully satisfactory.

6.1.2 By holding down tariffs, the Government has weakened the sector which has also been affected by the economic recession and recent sequences of devaluations. Despite this development, the Brazilian power sector continues to be very well managed with a better than average performance in satisfying an extremely rapid market growth and with good investment planning.

6.2 The Bank

6.2.1 Working relations between the Bank and FURNAS have been excellent. Loan 923-BR and other Bank loans have supported the efforts of Brazilian authorities to promote sound institutional and technical development. In particular, the Bank loans to FURNAS helped to finance an economic program of generation and transmission expansion in south-central Brazil, as originally laid down by CANAMBRA (para. 2.1.1). In addition, the supervision work of Bank staff has encouraged coordinated operations and planning (see Project Completion Report on the Salto Osorio Project, dated March 19, 1979) and sound sector financing (paras. 5.2.5 - 5.2.8), even if actual results have not achieved the levels of expected results.

6.2.2 In the late 1970's and 1980's, as part of its effort to combat inflation and taking into account economic and political considerations, the Government did not adjust tariff levels in the amounts required by the original revenue covenants. The Bank took an understanding attitude toward the changed conditions of the Brazilian economy, and accordingly negotiated in 1981 and 1983 new sector revenue agreements. Subsequent financial performance of the sector was in conformity with these agreements and indicated that Brazilian power authorities took a serious attitude with respect to their obligations. Renegotiation and enforcement of new revenue agreements was a reasonable approach; and indicated flexibility on the part of Bank management towards new economic conditions (paras. 5.2.7 and 5.2.8).

VII. LESSONS TO BE LEARNED

7.1 Monitoring Sector Policies

7.1.1 The sectoral developments during the execution of Itumbiara Project (para. 6.1.2) illustrate the need to pay continuing attention to basic policies even in relatively well-managed national power sectors, such as that of Brazil.

June 27, 1985

PROJECT COMPLETION REPORT BASIC DATA SHEET

BRAZIL

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC POWER PROJECT (LOAN 923-BR)

SUMMARY OF BANK LENDING TO FURNAS

<u>Loan Number</u>	<u>Signing Date</u>	<u>Amount (in million of US\$ equivalent</u>	<u>Principal Project Facilities</u>
211-BR	10/03/58	73.0	Furnas hydroelectric plant (900 MW)
403-BR	02/26/65	57.0	Estreito hydroelectric plant (1,050 MW)
474-BR	12/19/66	39.0	Transmission facilities associated with Estreito hydroelectric plant
565-BR	10/23/68	22.3	Porto Colombia hydro- electric plant (360 MW)
677-BR	05/25/70	80.0	Marimbondo hydro- electric plant (1,400 MW); associated trans- mission facilities; and 300 MW of additional capacity
923-BR	08/01/73	125.0	Itumbiara hydro- electric plant (2,080 MW) and associated transmission facilities
		<u>396.3</u>	

ANNEX 2.1

BRAZIL

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC PROJECT (LOAN 923-BR)

Major Covenants of the Loan and Guarantee Agreements for Loan 923-BR

1. The Loan Agreement obligated FURNAS to:
 - (a) not undertake any major generation or transmission expansion project costing in excess of two percent (2%) of gross fixed assets in operation plus work-in-progress before completion of the Project except in accordance with a financing plan satisfactory to the Bank (Section 5.05);
 - (b) apply for tariff adjustments as provided by law and revalue assets in a realistic fashion at least annually (Section 5.06);
 - (c) seek prior Bank agreement to any long-term borrowing above the limit of 66-2/3% of total fixed assets (Section 5.07).
2. The Guarantee Agreement obligated the Government to:
 - (a) provide sufficient financing to complete the Project under arrangements satisfactory to the Bank, if the Borrower lacked (or were believed to lack) sufficient funds to carry out the Project (Section 2.03);
 - (b) cause its agencies responsible for setting tariffs to act on any application of the Borrower within 30 days after receipt of such application (Section 3.02); and
 - (c) complete the Southeast Region and South Region Generation and Major Transmission Development Plans (Section 3.03).
3. With respect to the above covenants, the performance of the Borrower and the Guarantor was satisfactory.

ANNEX 3.1

PROJECT COMPLETION REPORT BASIC DATA SHEET

BRAZIL

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC POWER PROJECT (LOAN 923-BR)

ACTUAL AND FORECAST COMPLETION DATES: ITUMBIARA HYDROPLANT

<u>Item</u>	<u>Description</u>	<u>Actual</u>	<u>Forecast</u>	<u>Difference (days)</u>	
				<u>Delay</u>	<u>Advance</u>
1	Main Contractor at Site	11.30.74	06.30.74	153	-
2	River Diversion	09.01.76	10.30.76	-	60
3	Reservoir Filling	10.01.79	11.30.79	-	61
4.	Earth Dam				
4.1	Right Dam	11.30.79	12.30.79	-	30
4.2	Left Dam	09.30.79	12.30.79	-	91
5	Powerhouse	12.15.81	12.30.81	-	15
6	Commercial Operation				
6.1	Unit 1	04.27.80	03.30.80	28	-
6.2	Unit 2	08.05.80	06.30.80	36	-
6.3	Unit 3	11.24.80	09.30.80	55	-
6.4	Unit 4	03.23.81	02.28.81	23	-
6.5	Unit 5	07.20.81	07.30.81	-	10
6.6	Unit 6	12.16.81	12.30.81	-	14

BRAZIL

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC POWER PROJECT (LOAN 923-BR)

ACTUAL AND FORECAST QUANTITIES OF MATERIAL: ITUMBIARA HYDROPLANT

<u>I t e m s</u>	<u>Unit</u>	<u>Actual</u>	<u>Forecast</u>	<u>Quantity Difference</u>
<u>Excavation</u>				
Dam	m3	6,685,000	4,252,100	2,432,900
Spillway and Stilling	m3	2,230,200	1,990,000	240,200
Concrete Dam	m3	409,932	308,600	101,332
Penstocks	m3	11,654	12,000	(346)
Tailrace	m3	720,110	1,202,000	(481,890)
Substation	m3	266,060	242,400	23,660
Powerhouse	m3	281,859	273,300	8,559
Intake	m3	111,624	317,100	(205,476)
Cofferdam	m3	402,000	553,000	(151,000)
Total I		<u>11,118,439</u>	<u>9,150,500</u>	<u>1,967,939</u>
<u>Concrete</u>				
Spillway and Stilling	m3	542,130	565,000	(22,870)
Concrete Dam	m3	838,880	718,000	120,880
Substation	m3	11,645	9,500	2,145
Powerhouse	m3	250,419	154,000	96,419
Intake	m3	424,720	485,200	(60,480)
Total II		<u>2,067,794</u>	<u>1,931,700</u>	<u>134,083</u>
<u>Filling</u>				
Main Dam	m3	37,317,400	32,499,800	4,817,600
Cofferdam	m3	1,219,706	1,030,000	189,706
Substation	m3	793,850	1,071,000	(277,150)
Total III		<u>39,330,956</u>	<u>34,600,800</u>	<u>4,730,156</u>

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC PROJECT (LOAN 923-BR)

Project Changes, Actual and Forecast Completion Dates: Transmission Lines

Item No.	Transmission Lines	Description	Completion Dates		Commentary
			Actual	Forecast	
<u>Itumbiara System:</u>					
1.	Itumbiara-Sao Simao	500 kV; 1 circuit; 156 km	1979	1979/1980	Completed as expected.
2.	Sao Simao-Marimbondo	500 kV; 1 circuit; 200 km	Not Applicable (NA)	1979/1980	Deleted from project.
3.	Marimbondo-Agua Vermelha	500 kV; 1 circuit; 140 km	1979	1979/1980	Completed as expected.
4.	Itumbiara-Bandeirantes-Brasilia II	345 kV; 1 circuit; 346 km	1977	1977	Completed as expected. Initially (1977) operated at 230 kV; operated at 345 kV beginning in 1979, three years prior to date (1982) expected at appraisal.
<u>Rio de Janeiro & Espirito Santo Systems:</u>					
5.	Adrianopolis-Cachoeira II	138 kV; 2 circuits; 369 km	N.A.	1977/1978	FURNAS substituted lines at 345 kV (see item 8 for description) to take account of market trends in the state of Espirito Santo — namely the installation of new large steel mills and iron ore processing industries not anticipated at appraisal.
6.	Adrianopolis-Cachoeira III	138 kV; 2 circuits; 369 km	N.A.	1981/1982	Same as above (SAAS) (see item 9).
7.	Santa Oraz-Itaorna; Itaorna-Parati	138 kV; 2 circuits; 96 km; 51 km	1977	1977	Completed as expected, except for line between Itaorna and Parati which was replaced by a 500 kV line (Angra-Adrianopolis) not covered by Loan 923-BR, as a result of the installation of the nuclear power station at Angra dos Reis.
8.	Adrianopolis-Campos II; 1/ Campos-Vitoria I	345 kV; 1 circuit; 489 km	1977	N.A.	FURNAS added this line to Project in place of 138 kV line (2 circuits) between Adrianopolis-Cachoeira II (item 5) to take account of market developments not anticipated at appraisal. Facilities were operated initially (1977) at 139 kV, later (1978) at 345 kV.
9.	Adrianopolis-Campos III; 1/	345 kV; 1 circuit; 489 km	1978	N.A.	FURNAS added this line to Project in place of 138 kV line (2 circuits) between Adrianopolis and Cachoeira (item 6) to take account of market developments not anticipated at appraisal. Facilities were initially (1978) operated at 138 kV; later (1979) at 345 kV.
10.	Cachoeira-Vitoria II 1/	138 kV; 2 circuits; 136 km	1977	N.A.	FURNAS added this line to Project to take account of market developments not anticipated at appraisal.
11.	Alto Lage-Carapina 1/	138 kV; 2 circuits; 30 km	1977	N.A.	SAR
12.	Ilha dos Pombos-Palma 1/	138 kV; 2 circuits; 30 km	1977	N.A.	SAR
13.	Adrianopolis-CEPEL	138 kV; 2 circuits; 1.5 km	1977	N.A.	SAR

1/ Bank indicated its agreement to above changes in its letter of June 18, 1974.

FURNAS CENTRAIS ELÉTRICAS, S.A. (FURNAS)

ITUMBARA HYDROELECTRIC PROJECT (LOAN 923-BR)

Project Changes; Actual and Forecast Completion Dates

<u>Substations</u>	<u>Description</u>		<u>Completion Dates</u>	
	<u>Actual</u>	<u>Forecast</u>	<u>Actual</u>	<u>Forecast</u>
<u>Itumbara System</u>				
Itumbara	2 TL bays; 345 kV	1 TL bay; 345 kV	1979/1980	1981
	1 TL bay; 230 kV	1 Reactor (bank) 75 MVAR		
	2 Reactors; 25 MVAR (tri-phase)	1 Intertal bay		
	4 Reactors; 33.3 MVAR (mono-phase)	1 500/345 kV-400 MVA		
	2 TL bays; 500 kV (Sao Simao; Jaguará)	Transformer and related bays		
Marimbondo	1 TL bay; 500 kV	1 TL bay; 500 kV	1979/1980	1979/1980
	2 Reactors; 25 MVAR	1 Reactor (bank) 75 MVAR		
Bandeirantes	5 345 kV bays	5 345 kV bays	1977	1982
	3 Reactors; 20 MVAR (mono-phase)	1 345/230 kV		
	3 Reactors; 20 MVAR (mono-phase)	225 MVA transformer and related bays		
	2 Reactors; 25 MVAR (tri-phase)			
	1 345/230 kV - 225 MVA transformer			
Brasília Sal	3 345 kV bays	3 345 kV bays	1977	1982
	1 345/138 kV - 50 MVA (150 MVA) transformer	1 345/230 kV - 225 MVA transformer and related bays		
	1 345/230 kV - 75 MVA transformer	1 345/138 kV - 150 MVA transformer and related bays		
	2 Reactor; 25 MVAR (tri-phase)			
Campinas	1 500/345 kV - 400 MVA transformer	1 500/345 kV - 400 MVA transformer and related bays	Not Available	1981/1982
	2 Reactors; 25 MVAR (tri-phase)	1 345/138 kV - 225 MVA transformer and related bays		
	2 Reactors; 245 MVAR (monophase)			
	2 500 kV bays			
Rocos de Caldas	1 345/138 kV - 50 MVA Transformer (150 MVA)	-		-
Cachoeira Paulista	1 500 kV bay	-	1977	-

Substations	Description		Completion Dates	
	Actual	Forecast	Actual	Forecast
<u>Rio de Janeiro and Espirito Santo Systems</u>				
Parati	Cancelled	4 TL bays (138 kV)	-	1977/1978
Andrianopolis	2 TL bays; 138 kV 2 TL bays; 345 kV 1 TL bay; 500 kV 1 345/138 kV - 75 MVA; 225 MVA transformer 1 500/345 kV - 186.7 MVA (400 MVA) transformer capacitors, 2 x 40 MVA capacitors, 1 x 30 MVA	2 TL bays (138 kV) 2 345/138 kV - 225 MVA Transformers and related bays	1980/1983	1977/1982
Rocha Liso	Cancelled	4 TL bays; 138 kV		1977/1982
Campos	1 TL bays; 138 kV 4 TL bays; 345 kV 1 345/138 kV - 75 MVA (225 MVA) transformer 2 Reactors; 4 x 20 MVA 1 Reactor; 2 x 25 MVA (tri-phase)	4 TL bays; 138 kV	1979	1977/1982
Cachoeiro do Itapemirim	2 TL bays; 138 kV	2 TL Bays; 138 kV	1977	1977
Carapina	2 TL bays; 138 kV	-	1977	-
Ilha dos Pombas	2 TL bays; 138 kV	-	1977	-
Palmas	1 TL bay; 69 kV	-	1977	-
Imbarie	1 TL bay; 138 kV	-	1980	-
Santa Cruz	1 TL bay; 138 kV	-	1977	-
Itaorna	6 TL bays; 138 kV 1 138/13.8 kV - 7.5 MVA transformer	-	1977	-
Jacarepagua	2 TL bays; 138 kV 1 345/138 kV - 75 MVA (225 MVA) transformer capacitors, 100 MVA	-	1977	-

BRAZIL

Annex 3.3

FURNAS CENTRAIS ELÉTRICAS, S.A. (FURNAS)

ITUMBARA HYDROELECTRIC PROJECT (LOAN 923-BB)

Actual and Forecast Project Cost
(in millions of US\$, stated in current prices)

	Actual			Forecast 1/			Difference from Appraisal Forecast	
	Local Cost	Foreign Cost	Total Cost	Local Cost	Foreign Cost	Total Cost	Amount	Percent (%)
<u>Dam and Hydroelectric Station</u>								
Land	72.2	-	72.2	33.0	-	33.0	39.2	118.7
Civil works	218.0	73.1	291.1	130.7	108.0	238.7	52.4	21.9
Equipment	122.9	29.4	152.3	33.4	58.8	92.2	57.1	60.0
Engineering	36.4	0.7	37.1	8.7	2.7	11.4	25.7	225.4
Administration	101.5	-	101.5	61.4	-	61.4	40.1	65.3
Others	62.1	-	62.1	-	-	-	62.1	(Not Applicable N.A.)
Total	513.1	103.2	716.3	269.2	170.5	439.7	276.6	62.9
<u>Transmission</u>								
Land	-	-	-	3.8	-	3.8	(3.8)	N.A.
Civil works	7.5	-	7.5	26.3	2.9	29.2	(21.7)	(74.3)
Equipment	239.2	62.1	301.3	47.4	43.0	90.4	210.9	233.3
Engineering	4.7	-	4.7	4.1	3.1	7.2	(2.5)	(34.7)
Administration	17.1	-	17.1	22.9	-	22.9	(5.8)	(25.3)
Others	3.9	-	3.9	-	-	-	3.9	N.A.
Total	272.4	62.1	334.5	104.5	49.0	153.5	181.0	117.9
Total Cost	885.5	165.3	1,050.8	373.7	219.5	593.2	457.6	77.1

BRAZIL

Annex 3.6

FURNAS CENTRAIS ELÉTRICAS, S.A. (FURNAS)

ITURBIARA HYDROELECTRIC PROJECT (LOAN 923-BR)

Actual and Forecast Project Cost

(in millions of US\$)

	<u>Actual</u>			<u>Forecast</u>			<u>Difference from Appraisal Forecast</u>	
	<u>Local Cost</u>	<u>Foreign Cost</u>	<u>Total Cost</u>	<u>Local Cost</u>	<u>Foreign Cost</u>	<u>Total Cost</u>	<u>Amount</u>	<u>Percent (%)</u>
<u>Dam and Hydroelectric Station</u>								
Land	47.7	-	47.7	31.8	-	31.8	15.9	50.0
Civil works	149.9	50.0	199.9	114.4	94.5	208.9	(9.0)	(4.3)
Equipment	81.2	18.0	99.2	33.9	57.4	91.3	7.9	8.7
Engineering	26.1	0.7	26.8	8.3	2.7	11.0	15.8	143.6
Administration	66.7	-	66.7	58.7	-	58.7	8.0	13.6
Others 1/	-	-	43.0	-	-	-	43.0	Not Applicable (N.A.)
Subtotal (in constant 1973 prices)	414.6	68.7	483.3	247.1	154.6	401.7	81.6	20.3
Price contingency	198.5	34.5	233.0	22.1	15.9	38.0	195.0	513.2
Total Cost (in current prices)	613.1	103.2	716.3	269.2	170.5	439.7	276.6	62.9
<u>Transmission System</u>								
Land	-	-	-	3.4	-	3.4	(3.4)	N.A.
Civil works	4.7	-	4.7	23.2	2.6	25.8	(21.1)	(81.8)
Equipment	174.8	42.6	217.4	41.9	37.9	79.8	137.6	172.4
Engineering	3.0	0.1	3.1	3.6	2.7	6.3	(3.2)	(50.8)
Administration	10.4	-	10.4	20.2	-	20.2	(9.8)	(48.5)
Others	2.3	-	2.3	-	-	-	2.3	N.A.
Subtotal (in constant 1973 prices)	195.2	42.7	237.9	92.3	43.2	135.5 2/	102.4	75.6
Price contingency	77.2	19.4	96.6	12.2	5.8	18.0	78.6	436.7
Total Cost (in current prices)	272.4	62.1	334.5	104.5	49.0	153.5	181.0	117.9

1/ Includes site-installation costs and force-account costs for diversion structures.

2/ Physical contingencies of 12% have been added to the base cost of the transmission system.

BRAZIL

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC PROJECT (LOAN 923-BR)

Actual and Forecast Allocation of Loan Proceeds
(in millions of US\$)

<u>Category</u>	<u>Actual</u>	<u>Forecast</u>
I. Civil Works (Hydroelectric Station)	72.9	40.0
II. Hydroelectric Station, Transmission and Substation Equipment	52.1	62.0
III. Unallocated	-	3.0
	<u>125.0</u>	<u>125.0</u>

BRAZIL

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC PROJECT (LOAN 923-BR)

Actual and Forecast Timing of Accumulated Disbursements
(in millions of US\$)

<u>Date</u>	<u>Actual Total Disbursement</u>	<u>Forecast Total Disbursement</u>	<u>Actual Disbursements as a Percent of Forecast Disbursements</u>
06.30.74	0	1.0	0
12.31.74	0	3.3	0
06.30.75	0	12.3	0
12.31.75	11.6	27.3	42.5
06.30.76	25.2	41.3	61.0
12.31.76	32.3	50.8	63.6
06.30.77	53.0	60.5	87.6
12.31.77	62.1	70.5	88.1
06.30.78	73.5	85.5	86.0
12.31.78	86.3	103.8	83.1
06.30.79	94.9	111.8	84.9
12.31.79	106.4	115.8	91.9
06.30.80	112.8	119.8	94.2
12.31.80	114.0	123.0	92.6
06.30.81	115.9	1224.0	93.4
12.31.81	121.0	124.9	96.9
06.30.82	121.8	125.0	97.4
12.31.82	122.0	125.0	97.6
06.30.83	124.8	125.0	99.8
12.31.83	125.0	125.0	100.0

BRAZIL

ANNEX 3.9

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC PROJECT (LOAN 923-BR)

Price Deflator Indexes

<u>Brazilian</u>			<u>Deflators based on</u>		
<u>Price Index (I.G.P.)^{a/} b/</u>			<u>Brazilian Price Index</u>		
<u>Year-End</u>	<u>Average</u>		<u>Year-End</u>	<u>Average</u>	
1973	394	373	1.00 <u>d/</u>	1.01 <u>c/</u>	
1974	534	479	1.34	1.30	
1975	690	613	1.73	1.67	
1976	1,010	866	2.545	2.36	
1977	1,401	1,236	3.53	3.36	
1978	1,973	1,714	4.97	4.67	
1979	3,499	2,639	8.81	7.18	
1980	7,355	5,285	18.53	14.39	
1981	14,351	11,088	36.17	30.21	
1982	28,685	21,673	72.25	59.05	

Brazilian Price Index
for Imported Goods ^{a/} c/

Deflator based on Brazilian
Price Index for Imported Goods

	<u>Average</u>	<u>Average</u>
1973	70.33	0.99
1974	73.08	1.04
1975	88.46	1.26
1976	100.00	1.42
1977	101.90	1.45
1978	126.00	1.79
1979	128.00	1.82
1980	133.90	1.90
1981	142.10	2.02
1982	152.10	2.16

a/ Source Getulio Vargas Institute.

b/ IGP stands for General Index of Prices.

c/ May 1973 = '100.

d/ December 1973 = 100.

ENERGY - MW

BRAZIL
FURNAS CENTRAIS ELETRICAS (FURNAS)
ITUMBIARA HYDROELECTRIC PROJECT (923-BR)

Actual and Forecast Energy and Power Balance for Southeastern Region, 1971-1982

YEAR	COMPANY STATE OF S. PAULO FORECASTED	ACTUAL	CEMIG FOREC.	ACTUAL	LIGHT-RIO FOREC.	ACTUAL	ESCELSA FOREC.	ACTUAL	CEE+CEL+CEJ FOREC.	ACTUAL	CEB FOREC.	ACTUAL	OTHERS FOREC.	ACTUAL	WORK SITE FOREC.	ACTUAL	TOTAL FOREC.	ACTUAL	RA ACTUAL/FORECASTED
1971	627	627	190	190	260	311	48	27	32	53	-	-	-	-	-	-	1 1 157	1 209	4,5
1972	685	772	150	78	405	344	35	27	60	72	-	-	-	1	-	-	1 1 335	1 295	(3,0)
1973	710	863	210	93	465	415	60	38	110	116	50	35	-	-	-	-	1605	1 560	(2,8)
1974	735	966	225	76	565	505	20	1	130	146	65	58	-	1	-	-	1 1 740	1 754	0,8
1975	765	922	270	90	680	544	25	5	150	162	75	72	-	4	-	-	1 1 965	1 800	(8,3)
1976	800	1 073	270	201	795	536	45	36	170	196	85	81	-	14	-	-	3 2 165	2 140	(1,1)
1977	835	1 141	270	275	960	697	65	45	190	225	95	98	-	34	-	-	4 2 415	2 519	4,3
1978	875	1 141	270	194	1 095	952	85	101	210	255	100	107	-	155	-	-	4 2 635	2 909	10,4
1979	925	969	270	204	1 240	1 037	110	145	240	284	110	121	-	212	-	-	6 2 895	2 978	2,7
1980	980	809	270	182	1 430	1 134	140	181	270	328	120	134	-	175	-	-	8 3 210	2 951	(8,1)
1981	1 470	1 000	270	174	1 555	1 124	170	178	300	343	135	142	-	89	-	-	8 3 900	3 058	(21,6)
1982	2 020	817	270	92	1 740	1 278	210	176	340	376	145	151	-	153	-	-	14 4 725	3 057	(35,3)

PEAK - MW

YEAR	COMPANY STATE OF S. PAULO FORECASTED	ACTUAL	CEMIG FOREC.	ACTUAL	LIGHT-RIO FOREC.	ACTUAL	ESCELSA FOREC.	ACTUAL	CEE+CEL+CEJ FOREC.	ACTUAL	CEB FOREC.	ACTUAL	OTHERS FOREC.	ACTUAL	WORK SITE FOREC.	ACTUAL	TOTAL FOREC.	ACTUAL	RA ACTUAL/FORECASTED
1971	1 246	1 246	387	235	702	702	49	53	109	108	-	-	-	41	-	-	2 493	2 385	(4,3)
1972	1 070	1 298	250	250	690	766	55	54	115	127	-	-	-	49	-	-	2 2 180	2 546	16,8
1973	1 120	1 455	350	330	780	942	90	35	195	209	85	90	-	51	-	-	3 2 620	3 115	18,9
1974	1 170	1 548	375	375	950	930	25	21	230	249	110	110	-	33	-	-	3 2 860	3 269	14,3
1975	1 220	1 602	450	450	1 140	1 010	40	83	265	262	140	127	-	16	-	-	3 3 255	3 553	9,2
1976	1 280	1 691	450	490	1 340	1 083	60	131	300	281	155	149	-	41	-	-	4 3 585	3 870	7,9
1977	1 340	1 805	450	585	1 580	1 234	95	157	340	537	170	170	-	31	-	-	6 3 975	4 525	13,8
1978	1 410	1 809	450	585	1 800	1 638	105	247	380	440	185	193	-	161	-	-	6 4 330	5 049	16,6
1979	1 500	1 868	450	552	2 000	1 658	145	305	430	556	205	245	-	356	-	-	14 4 730	5 554	17,4
1980	1 590	1 686	450	450	2 260	1 766	195	313	480	540	225	244	-	393	-	-	25 5 200	5 417	4,2
1981	2 205	1 990	450	450	2 460	2 019	240	344	540	554	250	262	-	235	-	-	30 6 145	5 884	(4,2)
1982	2 890	2 570	450	544	2760	2 166	295	330	595	628	275	272	-	115	-	-	36 7 280	6 661	(8,5)

TABLE 3

ENERGY - MW

BRAZIL
FURNAS CENTRAIS ELETRICAS (FURNAS)
ITUMBIARA HYDROELECTRIC PROJECT (923-BR)

Actual and Forecast Sales by Customer, 1971-1982

YEAR	COMPANY STATE OF S. PAULO FORECASTED	ACTUAL	CEMIG FOREC.	ACTUAL	LIGHT-RIO FOREC.	ACTUAL	ESCELSA FOREC.	ACTUAL	CRB+CELP+CEJ FOREC.	ACTUAL	CEB FOREC.	ACTUAL	OTHERS FOREC.	ACTUAL	WORK SITE FOREC.	ACTUAL	TOTAL FOREC.	ACTUAL	AS ACTUAL/FORECASTED
1971	627	627	190	190	260	311	48	27	32	53	-	-	-	-	-	-	1 157	1 209	4,5
1972	685	772	150	78	405	344	35	27	60	72	-	-	-	1	-	-	1 335	1 295	(3,0)
1973	710	863	210	93	465	415	60	38	110	116	50	35	-	-	-	-	1 605	1 560	(2,8)
1974	735	966	225	76	565	505	20	1	130	146	65	58	-	1	-	-	1 740	1 754	0,8
1975	765	922	270	90	680	544	25	5	150	162	75	72	-	4	-	-	1 965	1 800	(8,3)
1976	800	1 073	270	201	795	536	45	36	170	196	85	81	-	14	-	-	2 165	2 140	(1,1)
1977	835	1 141	270	275	960	697	65	45	198	225	95	98	-	34	-	-	2 415	2 519	4,3
1978	875	1 141	270	194	1 095	952	85	101	210	255	100	107	-	155	-	-	2 635	2 909	10,4
1979	925	969	270	204	1 240	1 037	110	145	240	284	110	121	-	212	-	-	2 895	2 978	2,7
1980	980	809	270	182	1 430	1 134	140	181	270	328	120	134	-	175	-	-	3 210	2 951	(8,1)
1981	1 470	1 000	270	174	1 555	1 124	170	178	300	343	135	142	-	89	-	-	3 900	3 058	(21,4)
1982	2 020	817	270	92	1 740	1 278	210	176	340	376	145	151	-	153	-	-	4 725	3 057	(35,3)

PEAK - MW

YEAR	COMPANY STATE OF S. PAULO FORECASTED	ACTUAL	CEMIG FOREC.	ACTUAL	LIGHT-RIO FOREC.	ACTUAL	ESCELSA FOREC.	ACTUAL	CRB+CELP+CEJ FOREC.	ACTUAL	CEB FOREC.	ACTUAL	OTHERS FOREC.	ACTUAL	WORK SITE FOREC.	ACTUAL	TOTAL FOREC.	ACTUAL	AS ACTUAL/FORECASTED
1971	1 246	1 246	387	235	702	702	49	53	109	108	-	-	-	41	-	-	2 493	2 385	(4,3)
1972	1 070	1 298	250	250	690	766	55	54	115	127	-	-	-	49	-	-	2 180	2 546	16,8
1973	1 120	1 455	350	330	780	942	90	35	195	209	85	90	-	51	-	-	2 620	3 115	18,9
1974	1 170	1 548	375	375	950	930	25	21	230	249	110	110	-	33	-	-	2 860	3 269	14,3
1975	1 220	1 602	450	450	1 140	1 010	40	83	265	262	140	127	-	16	-	-	3 255	3 553	9,2
1976	1 280	1 691	450	490	1 340	1 083	60	131	300	281	155	149	-	41	-	-	3 585	3 870	7,9
1977	1 340	1 805	450	585	1 580	1 234	95	157	340	537	170	170	-	31	-	-	4 395	4 525	13,8
1978	1 410	1 809	450	585	1 800	1 608	105	247	380	440	185	193	-	161	-	-	4 330	5 049	16,6
1979	1 500	1 868	450	532	2 000	1 658	145	305	430	556	205	245	-	356	-	-	4 730	5 554	17,4
1980	1 590	1 686	450	450	2 260	1 766	195	313	480	540	225	244	-	393	-	-	5 200	5 417	4,2
1981	2 205	1 990	450	450	2 460	2 019	240	344	540	554	250	262	-	235	-	-	6 145	5 884	(4,2)
1982	2 890	2 570	450	544	2760	2 166	295	330	595	628	275	272	-	115	-	-	7 280	6 661	(8,5)

ANNEX 4.2

BRAZIL

ANNEX 4.3

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUNGARA HYDROELECTRIC PROJECT (LOAN 923-BR)

Return on Project Based on Actual Investment Costs, Expected Operating Costs, and Expected Tariff Levels

	<u>Marginal Sales (in GWh)</u>	<u>Average Revenue per kWh Sold (in centavos)</u>	<u>Marginal Revenues</u>	<u>Marginal 1/ Operating Costs</u>	<u>Net Marginal Revenues</u>	<u>Marginal Investment Costs</u>	<u>Marginal Net Benefits</u>	<u>Return on Investment (%)</u>
1973						351.7	(351.7)	
1974						126.9	(126.9)	
1975						367.6	(362.6)	
1976						684.2	(684.2)	
1977						848.5	(848.5)	
1978						713.9	(713.9)	
1979						629.9	(629.9)	
1980	2,483	7.1	176.3	10.5	165.8	547.3	381.5	
1981	5,764	7.6	438.1	19.4	418.7	100.7	318.0	
1982	5,962	6.7	399.5	26.3	373.2	61.2	312.0	
1983	7,281	6.2	451.4	21.2	430.2	346.5	83.7	
1984	7,281	6.5	470.8	21.2	449.6	6.2	443.4	
1985	7,281	6.7	493.3	21.2	472.1	0.0	472.1	
1986	7,281	7.1	516.9	21.2	495.7	0.0	495.7	
1987	7,281	7.4	541.7	21.2	520.5	0.0	520.5	
1988	7,281	7.8	567.7	21.2	546.5	0.0	546.5	
1989	7,281	8.2	595.0	21.2	573.8	0.0	573.8	
1990	7,281	8.6	623.7	21.2	602.5	0.0	602.5	
1991	7,281	8.9	653.8	21.2	632.6	0.0	632.6	
1992	7,281	9.4	683.5	21.2	664.3	0.0	664.3	
1993	7,281	9.6	718.7	21.2	697.5	0.0	697.5	
1994-2003	7,281	10.3	753.6	21.2	732.4	0.0	732.4	
2004	7,281	10.3	753.6	21.2	732.4	1,531.5	(799.2)	
2005-2028	7,281	10.3	753.6	21.2	732.4	0.0	732.4	9.1

1/ Source: FURNAS. Includes marginal cost of production, transmission, etc.

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC PROJECT (LOAN 923-BR)

Actual & Forecast Key Financial Ratios

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	Summary Ratios 1973-1982
1. Return on remunerable investment (X) ^{a/}											
FURNAS											
Forecast	9.9	12.7	12.6	12.5	12.0	12.0	12.0	12.0	12.0	12.0	12.0*
Actual	10.5	14.2	12.7	13.5	10.0	9.7	10.3	10.9	10.4	10.7	11.3*
Sector: Actual	10.0	10.4	12.2	11.4	11.2	8.6	7.7	4.9	7.9	7.3	9.2*
2. Average revenue per kWh sold ^{b/} (in constant 1973 centavos)											
FURNAS											
Forecast	11.0	11.8	12.1	11.7	12.1	11.3	12.7	11.5	10.9	9.5	11.3
Actual	8.9	8.4	9.5	7.8	7.8	6.5	6.8	7.1	7.6	6.7	7.5
Sector: Actual	22.5	20.7	22.9	20.3	19.1	19.1	18.1	15.3	18.1	17.0	18.7
3. Average operating expense per kWh sold ^{c/} (in constant 1973 centavos)											
FURNAS											
Forecast	3.4	3.3	2.8	2.6	2.5	2.4	2.1	1.9	1.6	1.5	2.2
Actual	1.8	1.8	1.6	1.9	2.0	1.7	2.0	1.6	1.8	1.7	1.8
Sector: Actual	5.7	5.6	5.6	5.4	5.3	5.2	5.5	5.1	5.9	5.5	5.2
4. Operating ratio (X) ^{d/}											
FURNAS											
Forecast	30.5	28.3	23.1	22.3	20.5	21.3	16.4	16.4	24.5	15.8	19.5
Actual	20.2	21.4	16.5	24.4	26.4	25.5	30.2	22.2	23.6	25.1	23.8
Sector: Actual	25.3	27.0	24.5	26.6	27.7	27.2	30.4	33.3	34.1	32.4	28.0
5. Debt-service ratio (times) ^{e/}											
FURNAS											
Forecast	1.9	1.6	1.8	1.7	1.5	1.5	1.9	1.9	1.7	1.5	1.7
Actual	1.9	1.4	1.9	1.1	1.3	1.5	1.2	1.0	1.0	0.9	1.2
Sector: Actual	2.4	2.3	2.3	2.1	1.9	1.3	1.2	0.7	0.9	0.6	1.1
6. Contribution ratio (X) ^{f/}											
FURNAS											
Forecast	24.6	24.0	23.8	32.8	34.8	26.3	46.3	64.1	75.4	77.3	40.1
Actual	24.8	17.5	22.9	3.0	9.2	13.0	7.5	Neg.	Neg.	Neg.	7.5
Sector: Actual	24.4	21.8	21.8	16.9	15.8	7.1	5.4	Neg.	Neg.	Neg.	4.2

FURNAS CENTRAIS ELETRICAS, S.A. (FURNAS)

ITUMBIARA HYDROELECTRIC PROJECT (LOAN 923-BR)

Actual & Forecast Key Financial Ratios

7. Depreciation ratio (X) ^{a/}

FURNAS

Forecast

Actual

3.29	2.95	3.28	3.05	3.20	2.94	3.28	2.95	3.15	2.98	3.11*
3.51	3.16	3.61	3.10	3.18	3.25	2.94	4.02	2.85	2.77	3.23*
Sector: Actual	Not Avail- able(NA)	NA	NA	NA	NA	NA	NA	NA	NA	NA

8. Debt-equity ratio(X) ^{b/}

FURNAS

Forecast

Actual

Sector: Actual

67.3	70.0	70.0	69.5	64.5	66.9	68.1	68.2	66.3	64.2	67.5*
66.1	66.5	70.1	68.1	70.7	65.3	72.3	75.1	76.7	77.0	70.8*
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

9. Debt-asset ratio(X) ^{c/}

FURNAS

Forecast

Actual

Sector: Actual

63.1	64.8	65.0	64.3	60.1	62.5	64.2	64.7	62.3	60.2	63.1*
60.6	61.1	64.5	64.5	66.7	62.0	67.5	65.5	62.0	60.3	63.5*
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

10. Net Customer receivables (days) ^{d/}

FURNAS

Forecast

Actual

Sector: Actual

35	30	30	30	30	30	30	30	30	30	30*
5	6	41	47	38	53	66	71	63	77	57*
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

a/ Net operating income before interest expense (plus receipts from the Global Guarantee Fund, if any)/operating assets (time weighted for addition) plus an allowance for working capital, materials, and supplies.

b/ Operating revenues/energy sales.

c/ Operating expenses less (a) reversion & guarantee, (b) depreciation & amortization; and (c) taxes/energy sales.

d/ Operating expenses less (a) reversion and guarantee; (b) depreciation and amortization, and (c) taxes/operating revenues.

e/ Gross internal cash generation/debt service.

f/ Net internal cash generation/total applications.

g/ Depreciation expense/average gross fixed assets in operation. The ratio was derived from actual financial data stated in current prices.

h/ Long-term debt (including current maturities)/equity plus long-term debt (including current maturities).

i/ Long-term debt (including current maturities)/net fixed assets (excluding the amortization reserve).

j/ Customer accounts receivable/operating revenues X 365. Data for years 1973-1975 taken from supervision reports. Data for subsequent years based on financial information stated in current prices and show in annual reports. Change to accrual accounting for income in 1975 accounts for increase in receivables over prior years.

*Annual Average

FURNAS HYDROELECTRIC POWER PROJECT

FURNAS - CENTRAIS ELÉTRICAS S.A.

BRAZIL

ACTUAL AND FORECAST INCOME STATEMENTS 1973-1982

(IN CONSTANT MAY-1973 - MILLIONS OF CR-RECORDED)

BRAZIL
FURNAS CENTRAIS ELÉTRICAS (FURNAS)
ITUMBARA HYDROELECTRIC PROJECT (923-BR)

Actual and Forecast Income Statements, 1973-1982
(in millions of constant May 1973 Cr\$)

ANNEX 5.2

	1973		1974		1975		1976		1977		1978		1979		1980		1981		1982		TOTAL 1973-1982	
	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED
GRAND TOTAL RECEIVED \$1																						
REVENUE SALES (COST)	13,872	13,795	15,359	15,090	16,771	16,771	17,811	18,799	19,017	20,054	21,335	22,387	23,023	24,197	25,350	25,999	26,457	26,792	28,124	25,775	31,301	31,301
AVERAGE REVENUE PER KW SOLD (constant)	8.9	11.0	8.4	11.0	9.3	9.3	12.1	7.8	11.7	7.8	12.1	6.3	11.3	6.8	12.7	7.1	11.9	7.6	10.9	6.7	9.3	9.3
OPERATING REVENUES	1,823.4	1,330.7	1,807.3	1,739.4	1,897.7	2,075.8	1,466.3	8,430.9	1,715.3	8,975.6	1,637.3	8,997.8	1,773.6	3,809.8	1,806.2	3,736.9	8,027.3	3,736.9	1,806.1	3,736.9	26,898.7	26,898.8
OPERATING EXPENSES																						
DEPRECIATION AND MAINTENANCE (1)	867.8	869.9	874.9	869.4	867.0	869.7	335.6	497.1	452.4	382.1	462.4	527.9	525.2	582.3	510.4	530.6	479.1	541.0	452.9	616.3	3,877.6	3,877.6
REPAIRS AND MAINTENANCE (2)	261.8	267.4	287.4	224.3	268.3	269.3	238.8	318.4	329.9	381.1	370.9	382.9	381.0	382.3	382.3	382.3	382.3	382.3	382.3	382.3	1,098.6	1,098.6
REPAIRS AND MAINTENANCE (3)	377.9	213.1	174.7	217.9	234.6	230.8	230.8	309.0	376.7	385.0	385.0	385.0	385.0	385.0	385.0	385.0	385.0	385.0	385.0	385.0	1,098.6	1,098.6
TAXES	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	35.6	1,098.6	1,098.6
TOTAL OPERATING EXPENSES	636.9	613.0	635.3	613.0	635.3	635.3	1,350.3	879.9	1,350.3	1,350.3	1,350.3	1,350.3	1,350.3	1,350.3	1,350.3	1,350.3	1,350.3	1,350.3	1,350.3	1,350.3	3,877.6	3,877.6
OPERATING INCOME	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	1,098.6	1,098.6
NET OTHER INCOME	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	1,098.6	1,098.6
TOTAL INCOME	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	630.0	1,098.6	1,098.6
INTEREST CHARGES																						
TOTAL INTEREST	419.7	369.6	419.7	369.6	419.7	419.7	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	606.3	1,098.6	1,098.6
LESS: INTEREST CHARGES TO CONSTRUCTION	(100.3)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	(220.9)	1,098.6	1,098.6
NET INTEREST CHARGES	319.4	148.7	198.8	148.7	198.8	198.8	385.4	385.4	385.4	385.4	385.4	385.4	385.4	385.4	385.4	385.4	385.4	385.4	385.4	385.4	1,098.6	1,098.6
OPERATING ADJUSTMENTS																						
CHANGE IN DEPRECIATION ACCOUNT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,098.6	1,098.6
NET DEPRECIATION VARIATIONS (5)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,098.6	1,098.6
NET INCOME	310.6	281.3	431.2	481.3	431.2	431.2	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	244.6	1,098.6	1,098.6
DATA OF FUNDS ON SPENDABLE INVESTMENT \$ (4)	10.17	9.9	10.17	12.7	13.69	12.6	13.34	12.5	9.85	12.0	9.72	12.0	10.88	10.0	10.24	12.0	10.37	12.4	10.70	12.0	1,098.6	1,098.6

NOTES:

1) Includes the Depreciation Quota since 1972 and the Depreciation and Construction Quota since 1973.

2) Includes the Depreciation Quota and the Special Exchange Variation Amortization Quota.

3) Represents the difference between the Assets' Monetary Variations and the Liabilities' Monetary Variations.

4) For the year ended December 31, 1982 under the "actual" caption, the 10.70% rate fixed by INFLA as per Ordinance INFLA nº 035/82 has been considered by Furnas through its 10.70% rate, which defines a 0.50% rate.

5) The adjusted values are expressed on December 31 Price's basis. Computed with index INFLA dated July 09, 1982 (item 8), and in order to prepare this chart, the values of "ESTIMATED" captions were corrected from December/71, to May/73 based on the variations of Brazil's General Price Index (Futuro Vargas Foundation) (May 1971: 100, May 1973: 100).

6) To take inflation account, ACTUAL figures have been adjusted according to the variations of Brazil's General Price Index (Futuro Vargas Foundation) - Family average, from the time of approval (May 1973): 1973: 100, 1974: 107, 1975: 107, 1976: 107, 1977: 107, 1978: 107, 1979: 107, 1980: 107, 1981: 107, 1982: 107, 1983: 107.

BRAZIL
FURNAS CENTRAIS ELÉTRICAS (FURNAS)
ITUUBARA HYDROELECTRIC PROJECT (923-BR)
 Actual and Forecast Sources and Application of Funds, 1973-1982
 (in millions of constant May 1973 Cr\$)

BRAZIL

FURNAS - CENTRAIS ELÉTRICAS S.A.

SOURCE AND APPLICATION OF FUNDS STATEMENT ESTIMATES COMPARED WITH ACTUAL
 (IN CONSTANT 1973 MILLION CRUZEIROS)

YEAR ENDING DECEMBER 31	1973		1974		1975		1976		1977		1978		1979		1980		1981		1982	
	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED
SOURCE OF FUNDS																				
INTERNAL CASH GENERATION																				
Operating Income	630,0	608,2	604,5	758,8	768,7	921,7	725,1	981,5	744,9	1.142,0	759,7	1.114,0	759,1	1.514,2	765,2	1.519,1	691,9	1.799,8	971,5	1.825,0
Depreciation	177,9	215,1	174,7	217,9	239,6	280,8	210,0	309,0	228,0	376,7	280,7	356,4	266,6	497,4	309,0	509,0	399,7	821,4	697,9	
Amortization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Internal Cash Generation	807,9	823,3	779,2	976,7	1.008,3	1.202,5	935,1	1.290,5	972,9	1.518,7	1.040,4	1.470,4	1.025,7	2.011,6	1.074,2	2.028,1	971,6	2.399,5	1.679,0	2.452,9
EXTERNAL SOURCES																				
FINANCIAL LOANS																				
Proposed EMB LOAN - Itaipava Project - 923	-	-	-	82,9	68,7	246,9	130,3	164,3	176,8	137,7	110,9	231,2	160,1	85,6	86,5	69,8	82,5	13,1	4,0	0,9
Parallel Financing Loans - Itaipava Project	-	-	-	12,6	27,7	28,2	28,2	71,4	20,4	95,9	35,1	97,0	84,0	132,1	51,7	49,0	24,4	19,2	21,0	3,7
OTHERS	1.167,8	1.155,7	1.084,1	1.087,5	1.206,1	1.110,3	2.360,8	813,2	1.892,6	743,3	2.821,1	1.182,2	1.821,1	881,2	2.823,1	810,1	3.122,1(2)	232,8	3.228,6(2)	232,8
Total Borrowings	1.167,8	1.155,7	1.084,1	1.100,5	1.224,8	1.220,5	2.519,3	1.009,6	2.186,8	974,7	2.967,5	1.451,4	2.079,2	1.097,4	2.339,5	959,7	3.226,2	365,1	3.331,6	266,6
SHARE CAPITAL																				
Government Grants	69,1	61,0	45,9	61,0	47,0	61,0	42,5	49,4	40,1	55,7	-	57,3	-	311,7	-	-	-	-	-	-
Deferred Income	(18,3)	-	71,3	-	102,1	-	82,1	-	(125,7)	-	-	(118,6)	-	-	-	-	-	-	-	-
TOTAL SOURCE OF FUNDS	1.985,3	2.039,8	2.044,3	2.141,5	2.329,7	2.369,2	3.799,2	2.409,3	3.044,3	2.500,4	3.311,0	2.951,8	3.214,1	3.109,0	3.542,5	2.987,8	4.190,8	2.725,9	4.410,6	2.694,5
APPLICATION OF FUNDS																				
Construction Expenditures	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Itaipava Project	187,9	-	126,9	-	302,6	-	604,2	-	844,5	-	713,9	-	699,9	-	517,3	-	340,7	-	61,4	-
Others	1.167,8	-	1.084,1	-	1.272,8	-	1.612,3	-	1.341,8	-	1.772,2	-	1.669,4	-	1.977,1	-	2.162,2(2)	-	2.179,2(2)	-
TOTAL EXPENDITURES	1.167,8	-	1.084,1	-	1.272,8	-	1.612,3	-	1.341,8	-	1.772,2	-	1.669,4	-	1.977,1	-	2.162,2(2)	-	2.179,2(2)	-
NET SERVICE																				
Amortization	151,7	155,1	209,8	211,1	202,4	215,3	140,6	229,5	144,9	229,2	270,6	137,4	273,2	159,7	319,1	311,5	345,2	69,2	259,6	259,6
Interest	119,7	228,6	118,8	328,0	640,1	397,6	649,3	661,4	624,3	624,3	624,3	1.115,5	267,7	1.523,4	271,8	1.629,4	749,5	2.230,3	2.230,3	2.230,3
(1) Refinancing Interest and Capitalized Interest	(128,3)	-	(11,8)	-	(278,3)	-	(231,3)	-	(329,6)	-	(329,6)	-	(329,6)	-	(329,6)	-	(329,6)	-	(329,6)	-
TOTAL NET SERVICE	112,9	155,7	209,8	609,1	524,0	620,9	824,4	749,1	760,5	909,5	609,2	990,8	690,6	1.066,4	1.115,1	1.009,3	959,0	1.396,7	1.147,6	1.694,0
INCREASE (OR DECREASE) IN NET WORKING CAPITAL (EX. CASH)																				
Accounts Receivable	4,0	-	3,0	-	131,8	-	34,8	-	21,0	-	33,0	-	160,5	-	221,9	-	189,8	-	25,4	-
Materials and Supplies	5,5	-	(4,4)	-	6,2	-	3,4	-	1,2	-	14,2	-	80,0	-	34,8	-	16,2	-	38,7	-
Provisions for Taxes	8,1	-	7,9	-	(5,7)	-	6,1	-	(8,3)	-	(8,3)	-	8,9	-	(122,1)	-	(122,1)	-	(122,1)	-
Accounts Payable and Accruals	123,1	-	133,6	-	155,1	-	122,6	-	189,2	-	(189,2)	-	(189,2)	-	(175,6)	-	(175,6)	-	(175,6)	-
TOTAL INCREASE (OR DECREASE) IN NET WORKING CAPITAL	(10,0)	(29,7)	(75,5)	(76,3)	77,8	(34,6)	6,7	(3,0)	(71,8)	31,4	(569,6)	(39,8)	(134,8)	31,8	(149,9)	112,7	(279,3)	176,1	(600,0)	4,0
REVENUES AND RESERVES PAID																				
Itaipava Project	187,9	-	126,9	-	302,6	-	604,2	-	844,5	-	713,9	-	699,9	-	517,3	-	340,7	-	61,4	-
Others	(19,2)	-	(24,3)	-	14,2	-	(122,1)	-	302,7	-	74,0	-	30,8	-	(175,2)	-	(175,2)	-	(175,2)	-
TOTAL APPLICATION OF FUNDS	2.061,6	2.039,8	1.904,3	2.141,5	2.399,6	2.369,2	3.822,4	2.409,3	3.351,1	2.500,4	3.186,1	2.951,8	3.249,8	3.109,0	3.460,6	2.987,8	4.190,8	2.725,9	4.410,6	2.694,5
Net Cash Accrual (or Deficit)	(75,3)	-	(162,2)	-	6,2	-	286,8	-	(286,6)	-	(286,6)	-	(286,6)	-	(286,6)	-	(286,6)	-	(286,6)	-
Cash Balance beginning of year	220,7	-	129,8	-	200,1	-	129,8	-	220,7	-	129,8	-	220,7	-	129,8	-	220,7	-	129,8	-
Cash Balance end of year	220,4	-	129,6	-	206,3	-	129,8	-	220,4	-	129,8	-	220,4	-	129,8	-	220,4	-	129,8	-
Times annual debt service covered by internal cash generation																				
	1,9	1,9	1,4	1,4	1,9	1,9	1,1	1,7	1,3	1,5	1,3	1,3	1,3	1,9	0,9	1,9	1,0	1,7	0,9	1,3

1) Refinancing Interest and Capitalized Interest: are capitalized interest and interest paid with Eletrobrás' resources.

2) Including the investment on Angra II and III Nuclear Power Plants; their construction under specific legislation (Decreto-Lei 2820 and Decree 65750) is now at the responsibility of ELETRO - Sociedade Construtora de Centrais Nucleares S.A.

3) Including the financing disbursement of Eletrobrás Construtora de Centrais Nucleares S.A., corresponding to the total investment financing on the Angra II and III Nuclear Power Plants.

The appraisal values are expressed on December 31 Price's basis. Complying with table 1220 dated July 07, 1978 item 8, and in order to prepare this chart, the values of "ESTIMATED" captions were corrected from December 31 to May 73 based on the Variation of Brazil's General Prices Index (Detalhe Vargas Foundation) (Dec. 1971: 80,92; May 1973: 100).

To take inflation account, ACTUAL figures have been adjusted according to the variations of Brazil's General Price Index (Detalhe Vargas Foundation) - Yearly average, from the time of appraisal (May 1973).

May 1973: 100; 1973: 101,71; 1974: 120,61; 1975: 167,01; 1976: 226,01; 1977: 336,71; 1978: 467,01; 1979: 710,91; 1980: 1420,61; 1981: 3081,81; 1982: 9909,31.

BRAZIL
FURNAS CENTRAIS ELÉTRICAS (FURNAS)
ITUMBARA HYDROELECTRIC PROJECT (923-BR)
Actual and Forecast Balance Sheet, 1973-1982
(in millions of constant December 1973 Cr\$)

ANNEX 5.4

	1973		1974		1975		1976		1977		1978		1979		1980		1981		1982	
	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED	ACTUAL	ESTIMATED
ASSETS																				
FIXED ASSETS IN OPERATION	6,602.6	7,914.6	5,027.8	8,092.5	7,756.9	10,450.9	7,279.2	11,478.9	8,432.2	13,939.6	10,242.7	14,350.5	9,125.6	18,473.1	7,556.9	18,505.4	9,121.8	22,276.2	9,707.6	29,321.5
SPECIAL EXCHANGE RATE VARIATION	-	-	-	-	-	-	-	-	-	-	-	-	8,252.4	-	1,600.9	-	1,481.3	-	1,452.1	-
AMORTIZATION ACCUMULATED	-	-	-	-	-	-	-	-	-	-	-	-	(1.8)	-	(80.6)	-	(162.3)	-	(256.9)	-
DEPRECIATION RESERVE	(864.2)	(697.5)	(820.4)	(1,223.1)	(1,021.9)	(1,526.8)	(1,022.6)	(1,861.2)	(1,061.6)	(2,473.8)	(1,706.8)	(2,652.7)	(1,652.7)	(3,222.7)	(1,422.1)	(3,773.3)	(1,622.8)	(5,254.0)	(1,870.9)	(1,103.8)
NET FIXED ASSETS IN OPERATION	5,737.4	6,987.1	4,947.4	6,869.4	6,735.0	8,924.1	6,156.6	9,617.7	7,370.6	11,723.8	8,535.9	11,697.8	7,469.5	15,250.4	7,695.1	15,128.1	7,789.4	17,859.2	9,059.9	18,218.1
WORK IN PROGRESS	2,120.7	2,650.8	2,947.9	3,613.9	2,760.3	3,719.8	3,253.3	4,266.2	3,313.5	4,494.2	3,251.9	4,219.0	3,215.0	4,515.6	3,157.3	4,711.8	3,372.6	4,054.5	3,612.9	4,221.7
TOTAL FIXED ASSETS	7,858.1	9,637.9	7,895.3	10,483.3	9,495.3	12,643.9	10,410.0	14,123.9	12,684.0	16,208.0	16,787.1	16,502.6	18,674.5	16,185.0	16,182.5	18,839.9	20,162.0	21,913.7	22,831.7	22,439.8
CURRENT ASSETS																				
CASH AND TEMPORARY INVESTMENTS	263.3	320.2	352.6	64.4	260.3	62.8	444.0	63.6	346.8	70.6	221.6	58.2	36.2	29.8	60.1	176.7	87.4	69.3	34.8	80.1
MATERIAL AND SUPPLIES	29.4	32.6	34.7	35.4	11.4	15.9	45.1	51.7	45.7	61.0	48.7	51.8	82.2	35.2	30.5	100.3	41.9	104.9	104.9	104.9
ACCOUNTS RECEIVABLE	14.2	155.0	19.6	156.2	162.1	187.4	221.4	201.1	244.1	230.4	216.6	214.2	318.5	280.3	297.6	291.9	317.0	335.7	335.6	332.7
OTHER CURRENT ASSETS	13.1	12.5	15.7	12.3	36.6	12.3	22.1	12.3	86.9	12.3	130.4	12.3	11.1	12.3	12.3	23.7	12.3	12.3	12.3	12.3
OTHER ASSETS	15.5	80.8	20.2	10.7	23.6	10.8	25.2	10.8	105.5	10.8	167.3	10.8	20.9	11.6	40.8	62.3	160.7	22.2	160.7	160.7
TOTAL ASSETS	8,201.6	9,561.0	8,248.1	10,793.3	9,935.3	13,003.1	11,244.9	14,493.4	13,025.9	15,625.1	17,566.5	17,312.9	19,335.0	18,618.2	16,618.0	19,446.6	20,916.9	21,976.0	23,638.4	23,604.4
CAPITALIZATION AND LIABILITIES																				
CAPITALIZATION																				
NET CAPITAL	1,703.6	2,759.8	1,804.5	2,763.8	2,341.8	2,709.2	2,750.6	3,203.9	2,824.0	4,071.8	3,208.7	4,079.8	2,807.2	4,223.3	2,583.7	4,127.3	2,195.7	4,396.1	1,710.7	4,446.8
CAPITAL RESERVES	-	41.6	-	61.6	-	68.0	-	44.5	-	89.0	-	126.4	667.6	132.2	478.9	811.1	483.0	47.2	1,144.9	38.6
RETAINED EARNINGS																				
APPROPRIATED																				
LEGAL AND STATUTORY RESERVES	70.5	80.6	73.1	106.4	77.8	132.4	73.3	161.8	76.1	192.7	110.3	230.4	189.7	269.9	142.0	310.1	277.8	254.7	206.3	400.0
OTHER RESERVES	388.4	4.8	186.9	4.8	108.0	4.8	141.9	4.8	204.0	4.8	1,047.5	4.8	689.8	4.8	1,100.7	4.8	1,100.7	4.8	1,147.1	4.8
UNAPPROPRIATED RETAINED EARNINGS	297.2	297.3	298.4	433.5	244.6	536.6	178.5	628.7	341.4	608.4	954.7	903.4	856.1	1,046.2	25.0	1,168.9	-	1,338.4	-	1,643.9
OTHER TERM DEBT	4,791.5	5,667.8	4,822.9	6,797.6	6,037.1	8,218.3	6,704.8	9,108.1	8,324.9	9,144.3	10,297.8	10,546.6	12,733.6	11,464.6	10,594.4	12,198.6	13,432.8	11,049.1	17,015.8	11,480.4
CURRENT LIABILITIES	(271.1)	(240.8)	(311.7)	(274.0)	(250.8)	(206.8)	(212.8)	(222.2)	(175.9)	(173.2)	(187.4)	(187.4)	(167.4)	(157.4)	(146.1)	(146.1)	(146.1)	(146.1)	(146.1)	(146.1)
NET LONG-TERM DEBT	4,520.4	5,407.0	4,511.2	6,523.6	5,786.3	7,911.5	6,492.0	8,885.9	7,949.0	8,471.1	9,910.4	10,359.2	12,566.2	11,307.2	10,448.3	11,488.4	13,127.4	11,198.1	16,684.9	10,499.0
AMORTIZATION	353.3	370.1	468.7	370.1	478.7	370.1	605.5	370.1	600.6	370.1	503.9	370.1	379.5	370.1	370.1	370.1	370.1	370.1	370.1	370.1
SPECIAL LIABILITIES (FUTURE CAPITAL INCREASE) (2)	-	-	-	-	-	-	-	-	-	-	-	-	207.3	207.3	207.3	207.3	207.3	207.3	207.3	207.3
OTHER LONG-TERM DEBT (3)	-	66.9	-	133.7	-	200.5	-	254.0	-	254.0	-	254.0	-	254.0	-	254.0	-	254.0	-	254.0
CURRENT LIABILITIES																				
CURRENT LIABILITIES	281.1	260.8	311.5	274.0	290.8	212.2	212.2	212.2	212.2	212.2	212.2	212.2	212.2	212.2	212.2	212.2	212.2	212.2	212.2	212.2
ACCOUNTS PAYABLE AND ACCRUALS	165.1	77.1	156.0	80.2	84.9	84.9	84.9	84.9	84.9	84.9	84.9	84.9	84.9	84.9	84.9	84.9	84.9	84.9	84.9	84.9
DEBT CONTRACT	64.4	-	87.9	-	105.8	-	111.9	-	105.8	-	105.8	-	105.8	-	105.8	-	105.8	-	105.8	-
PROVISIONS FOR TAXES	30.9	35.3	28.8	32.3	28.8	32.3	28.8	32.3	28.8	32.3	28.8	32.3	28.8	32.3	28.8	32.3	28.8	32.3	28.8	32.3
DIVIDENDS AND OTHER PAYABLE	141.5	160.5	169.4	169.5	169.4	169.5	169.4	169.5	169.4	169.5	169.4	169.5	169.4	169.5	169.4	169.5	169.4	169.5	169.4	169.5
OTHERS	15.3	-	124.3	-	229.8	-	256.8	-	256.8	-	256.8	-	256.8	-	256.8	-	256.8	-	256.8	-
TOTAL CURRENT LIABILITIES	756.2	513.7	607.1	501.8	607.1	501.8	607.1	501.8	607.1	501.8	607.1	501.8	607.1	501.8	607.1	501.8	607.1	501.8	607.1	501.8
TOTAL LIABILITIES	8,201.6	9,561.0	8,248.1	10,793.3	9,935.3	13,003.1	11,244.9	14,493.4	13,025.9	15,625.1	17,566.5	17,312.9	19,335.0	18,618.2	16,618.0	19,446.6	20,916.9	21,976.0	23,638.4	23,604.4
DEBT TEST:																				
PERCENTAGE OF LONG-TERM DEBT INCLUDING LONG-TERM DEBT DUE WITHIN ONE YEAR TO TOTAL FIXED ASSETS	60.6	63.1	61.1	64.8	64.9	65.0	64.3	64.5	66.66	60.1	61.96	60.5	67.46	64.2	62.47	64.1	62.04	62.3	64.37	60.2

- NOTES:**
- "Other capital reserves" includes under the "estimated" caption the value of "Reserve interest on equity funds capitalized" presented in the chart "Actual and Forecast Balance Sheet, 1971-1982" of the Itumbara Project Appraisal.
 - "Other liabilities" are the Eletrobrás' resources recorded in the account "Other Commitments - Reimbursable Resources - New Issues - Eletrobrás" to be forcefully converted into stock capital.
 - "Other long term debt" under the "estimated" caption consists in "Federal Government Contributions" presented in the chart "Actual and Forecast Balance Sheet, 1971-1982" of the Itumbara Project Appraisal.
 - For purpose of calculation of the Indebtedness Ratio, the amount of Cr\$ 999,8 million from Eletrobrás' ECF Contracts, which will be subject to remuneration with resources established in the article 5th of Decree 86250 as of June 30, 1974 should be excluded.
 - This position does not include the amount of Cr\$ 3,716,3 million in the utility plant nor Cr\$ 4,069,6 million in the local issue, both related to the nuclear power - plants of ANGRA II and III because the formation of those accounts was based on contracts signed with ELETROBRÁS (construction) and ELETROBRÁS (integral borrower) in accordance with special legislation that rules the construction of nuclear power - plants as a part of the Brazilian nuclear program (Decree-law of 1.830 of October 10, 1950 and Decree of 86.290 of July 30, 1973).
- These Decrees establish rules that avoid economic and financial impacts in the electric companies from the acquisition of nuclear power - plants.
- In this contract, the article 4th of the Decree 86.290 prescribes that the portion of own resources of the electric company in the total payments for the nuclear power - plant acquired is limited to the cost of a conventional hydro-electric plant of equivalent capacity, allowed that the difference is to be absorbed in accordance with the Article 200 of the Law 6.466 of December 15, 1976 (Corporation Law).
- Due to the above-mentioned disposition the assets and liabilities related to these facts were not computed in the indebtedness calculation.
- The appraisal values are expressed on December 71 Price's basis. Complying with table DEMO dated July 03, 1974 item 5, and in order to prepare this chart, the values of "FIXED ASSETS" captions were converted from December/73, to December/73 based on the variations of Brazil's General Price Index (Gustavo Vargas Foundation) (Dec. 1971: 74.79; Dec. 1973: 100).
- To take inflation account, "ACTUAL" figures have been adjusted according to the variations of Brazil's General Price Index (Gustavo Vargas Foundation) - at the end of each year, from the time of appraisal (Dec. 1973: 100; 1974: 134.6; 1975: 173.6; 1976: 234.3; 1977: 333.3; 1978: 497.3; 1979: 801.6; 1980: 1,033.6; 1981: 1,617.0; 1982: 1,223.5).

BRAZIL
FURNAS CENTRAIS ELÉTRICAS (FURNAS)
TIMBETARA HYDROELECTRIC PROJECT (LOAN 923-BR)
POWER SECTOR

HISTORICAL FLOW OF FUNDS ^{a/}
(In millions of current Cr\$)

Year ending Dec. 31	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
<u>SOURCES</u>	<u>9,580</u>	<u>14,112</u>	<u>24,913</u>	<u>38,011</u>	<u>59,795</u>	<u>95,279</u>	<u>164,736</u>	<u>310,201</u>	<u>731,640</u>	<u>1,373,783</u>
Net internal cash generation	1,858	2,441	4,644	6,179	5,119	4,544	5,936	(37,979)	(48,707)	(278,343)
Gross internal cash generation	3,997	5,481	9,609	12,381	20,593	28,988	63,888	107,213	259,357	477,478
Capital Service	2,139	3,040	4,965	6,202	15,474	24,444	57,952	145,192	308,064	764,821
Amortization payments	949	1,278	2,391	2,885	5,565	9,897	21,799	57,556	105,295	237,941
Interest payments	714	1,126	1,797	3,074	5,566	12,337	33,254	85,489	199,578	519,746
Dividend payments (net)	476	636	777	243	4,343	2,210	2,899	2,147	3,191	7,134
Other consumer-based contributions	3,485	4,667	6,561	10,708	15,518	23,603	33,540	64,720	182,892	314,745
Sole tax	1,208	1,613	2,135	3,097	4,863	6,811	9,302	17,653	41,842	63,509
Compulsory loan	1,074	1,400	2,021	3,274	4,366	7,362	11,165	21,479	45,121	88,845
Reversion	1,203	1,654	2,405	4,337	6,289	9,430	13,073	25,588	95,929	162,391
Equity contributions	1,327	2,148	4,282	4,239	7,082	8,195	10,743	20,798	69,374	140,415
Federal government	258	709	1,402	1,480	2,281	3,162	4,554	6,650	41,505	62,562
State governments	1,204	1,241	1,465	1,304	3,861	3,149	1,568	5,537	12,134	35,214
Municipalities and others	(135)	198	1,415	1,455	940	1,844	4,621	8,611	15,735	42,639
Borrowings	2,910	4,856	9,426	16,885	32,076	58,937	114,544	262,662	528,081	1,196,966
Local	740	1,666	3,737	9,440	11,019	21,601	52,539	102,226	167,696	434,920
Foreign	2,170	3,190	5,689	7,445	21,057	37,336	62,005	160,436	360,385	762,046
<u>APPLICATIONS</u>	<u>9,580</u>	<u>14,112</u>	<u>24,913</u>	<u>38,011</u>	<u>59,795</u>	<u>95,279</u>	<u>164,763</u>	<u>310,201</u>	<u>731,640</u>	<u>1,373,783</u>
Investments	8,847	12,973	20,962	33,026	52,652	82,516	126,515	236,322	526,545	1,092,897
Increase in working capital	733	1,139	3,951	4,986	7,143	12,763	38,248	73,879	205,095	280,886

a/ Sources: "Fontes e Usos de Recursos do Setor de Energia Elétrica", ELETROBRAS
See Annex 2-3/1 for graphic presentation.

BRAZIL
FURNAS CENTRAIS ELÉTRICAS, S.A. (FURNAS)
ITUMBIARA HYDROELECTRIC POWER PROJECT (LOAN 923-BR)

Historical Cost of Service & Remuneration
(in millions of current Cr\$)

Year ending December 31	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982 ^{a/}
Remunerable investment (net)	38,768.3	49,428.5	73,113.8	95,012.7	132,093.3	279,859.8	484,511.6	1,003,687.8	1,920,209	4,205,453
Gross remunerable investment	43,539.1	56,440.3	85,942.4	113,269.8	182,340.2	340,209.3	572,412.7	1,134,459.2	2,183,442	4,744,509
Utility plant in service	39,286.9	51,099.7	81,072.1	109,504.7	177,178.9	334,091.9	561,040.9	1,115,775.4	2,163,186	4,704,640
Working capital	4,242.2	5,340.6	4,870.3	3,765.1	5,161.3	6,117.4	11,367.8	18,683.8	18,256	39,669
Deductions (accumulated)	4,770.8	7,011.8	12,822.6	18,257.1	30,244.7	60,349.5	67,901.1	130,771.4	263,233	539,056
Depreciation	4,788.0	6,757.5	10,640.0	14,612.6	22,504.0	44,675.0	78,033.1	146,584.0	304,820	683,501
Amortization	-	-	-	-	-	-	84.8	6,745.2	26,284	58,958
Contributions and grants	1,486.2	2,084.8	2,984.1	4,215.4	8,259.2	19,977.7	25,013.7	45,131.6	88,788	151,266
Excess (deficiency) in remuneration	(1,501.4)	(1,870.5)	(795.5)	(570.9)	(518.5)	(4,303.2)	(15,230.5)	(67,689.4)	(156,459)	(354,469)
Revenues	11,567.0	15,376.1	24,115.9	34,482.5	52,207.9	80,895.4	131,186.4	246,121.3	631,191	1,229,871
Electricity billing	8,791.8	11,899.6	19,179.6	26,788.2	47,208.0	64,148.6	105,772.5	196,669.2	516,693	1,016,718
Social security tax	158.3	107.1	172.6	241.1	50.0	-	-	-	-	-
Sole Tax	1,543.4	1,969.3	2,742.3	4,179.5	5,584.0	9,384.3	14,248.9	26,800.7	69,377	111,158
Compulsory loan	1,073.5	1,400.1	2,021.4	3,273.7	4,365.9	7,362.3	11,165.0	22,651.4	45,121	101,995
Cost of service	8,791.8	11,899.6	19,179.6	26,788.2	42,208.0	64,148.6	105,772.5	196,669.2	516,693	1,016,718
Operating expenses	2,927.6	4,172.1	5,946.2	9,174.4	14,596.0	21,990.2	39,888.9	81,872.6	205,635	399,985
Personnel	1,587.3	2,187.2	3,351.4	5,232.5	8,319.1	13,192.4	24,431.6	47,280.2	120,737	249,102
Material and other	1,042.3	1,502.1	1,927.9	2,761.7	4,605.8	6,875.1	12,202.3	21,748.6	58,986	114,524
Fuel	274.9	377.0	465.7	805.0	768.4	1,728.5	2,640.9	12,302.6	23,912	26,359
Other	27.1	105.8	201.2	375.2	902.7	194.2	624.1	541.2	-	-
Depreciation and amortization	959.1	1,224.1	2,330.0	3,270.3	3,302.3	11,026.7	17,859.6	42,232.1	77,289	173,883
Reversion	1,034.9	1,367.0	2,006.9	3,466.8	3,216.6	6,930.4	10,490.1	23,664.7	81,348	134,698
Remuneration (annual)	3,870.2	5,136.4	8,896.5	10,876.7	17,093.1	24,201.3	37,523.9	48,899.8	132,421	308,152
Legal	4,365.8	5,485.3	7,881.5	10,652.1	17,080.7	27,986.0	48,451.2	100,368.8	192,020	420,545
Excess (deficiency)	(495.6)	(329.1)	1,035.0	224.6	52.4	(3,784.7)	(10,927.3)	(51,469.0)	(39,599)	(112,393)
Rate of remuneration (%)	10.0	10.4	12.2	11.4	11.2	8.6	7.7	4.9	7.9	7.3
Energy Sales (GWh)	50,544.0	57,039.0	63,112.0	72,071.0	81,245.0	90,541.0	101,088.0	112,115.0	115,431	122,477
Increase (%)	14.8	12.9	10.7	14.1	12.8	11.5	11.6	11.0	3.0	6.1

^{a/} Preliminary

FURNAS  CENTRAIS ELÉTRICAS SA

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COMMENTS FROM THE BORROWER

Presidente

Rio de Janeiro, January 09, 1986
Our Ref.: DP.E.007.86

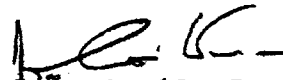
The World Bank
Attn.: Mr. Yukinori Watanabe
Director
Operations Evaluation Department
1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

Subject: Project Completion Report on
Brazil Itumbiara Hydroelectric Project
(Loan 323-BR)

Dear Sirs,

1. We thank you for your letter dated October 22, 1985 in which you enclosed a draft of the above referred report, for our comments.
2. We have examined the document and found it very satisfactory. 1/
We have only corrected some clerical mistakes as shown in the annex.

Sincerely,



João Camilo Penna
President

Enclosure

1/
Bank accepted all of borrower's editorial corrections; and these are reflected in report.

JAN 23 1986

I - BACKGROUND (Page 3)

1. Item 1.3.2. - 4th line - After "transmission lines" should read:
(at 138,230,345,500 and 765 KV)
2. Item 1.3.3. - 3rd line - after "626 MW", substitute "is under commissioning tests" for "started commercial operation on January 17, 1985?"
3. Item 1.3.3. - 5th line - after "purchase" substitute "all" for "most (about 85%) of".

II - PROJECT PREPARATION AND APPRAISAL (Page 5)

1. Item 2.2.1. (c) - 1st line - after "transmission lines" substitute "(323 km)"for"(496 km)".
2. Item 2.2.3. 1st line - after "150 km of" change "single" for "double".

III - ANNEX 3.1 (Page 22)

1. Item 4.1.- Column "Actual" - Write 11.30.79 instead of 11.30.70
2. Item 4.2 - Column "Actual" - Write 09.30.79 instead of 11.30.79
3. Item 6.6 - Column "Forecast" - Write 12.30.81 instead of 02.30.81

IV - ANNEX 3.3. (Page 24)

1. Item n° 7 - Column "transmission lines" - Write Santa Cruz instead of Santa Oraz.
2. Item n° 8 - Column "commentary" - 7th line - Write 138 KV instead of 139 kv.

3. Item nº 10 - Column "transmission lines" - write Cachoeiro instead of Cacheiro.
4. Item nº 10 - Column "description" - write 106 km instead of 136 km.
5. Item nº 10 - Column "Actual" - write 1979 instead of 1977

V - ANNEX 3.4 (Page 1 of 2) (Page 25)

1. Column "Substations"

- 1.1. Write Brasilia Sul instead of Brasilia Sal

2. Column (Description) "Actual"

- 2.1. 16th line - insert (225 MVA) after 75 MVA
- 2.2. 20th line - change 2 reactors; 245 MVAR (Monophase) for 4 reactors; 24.5 MVAR (Monophase).
- 2.3. 21th line - Write 2 TL 500 KV bays instead of 2.500 KV bags. Include a new line with 2 reactors 50 MVAR (tri-phase)
- 2.4. Last Line - Write 1 TL 500 KV bay instead of 1 500 KV bag
3. Column (Description) "Forecast"
- 3.1. 3rd line - Write Intertie bay instead of Intertel bay
- 3.2. Lines 5th, 11th, 14th, 16th, 18th and 20th - Write bays instead of bags.

ANNEX 3.4. (Page 2 of 2) (Page 26)

1. Column "Substations"

Write

- 1.1. Adrianopolis instead of Andrianopolis
- 1.2. Ilha dos Pombos instead of Ilha dos Pombas

1.3. Jacarepagua instead of Jacarepagna

2. Column (Description) "Actual"

- 2.1. 5th line - Put 225 MVA into parenthesis
- 2.2. 9th line - Write 40 MVAR instead of 40 MVA
- 2.3. 10th line - Write 30 MVAR instead of 30 MVA
- 2.4. 12th line - Write bay instead of bays
- 2.5. 16th line - Write 20 MVAR instead of 20 MVA
- 2.6. 17th line - Write 25 MVAR instead of 25 MVA
- 2.7. 20th line - Write bays instead of baays
- 2.8. 23th line - Change 1 tl bay to 2 tl bays
- 2.9. Include with reference to Campos Substation: "1 Reactor, 3 x 20 MVAR".

3. Column "Forecast" (Description)

- 3.1. 2nd line - Write 2 tl bays (138 kv) to 4 tl bays (138 kv)
- 3.2. 4th line - Write bays instead of bags
- 3.3. 5th line - Change 4 tl bays; 138 kv to 8 tl bays; 138 kv
- 3.4. 6th line - Change 4 tl bays; 138 kv to 8 tl bays; 138 kv
- 3.5. 7th line - Change and write 2 tl bags; 138 kv to 4 tl bays; 138 kv

4. Column "Actual" (Completion Dates)

- 4.1. last date related to Jacarepagua substation shall be 1977/1984.

5. Complete the Annex 3.4. with the following:

<u>Substations</u>	<u>Description</u>		<u>Completion Dates</u>	
	<u>Actual</u>	<u>Forecast</u>	<u>Actual</u>	<u>Forecast</u>
Vitoria	2 345/138 kv-75 MVA (225 MVA)	-	1978	-
	2 TL bays 345 kv	-	-	-
	1 Reactor, 4 x 20 MVAR	-	-	-
	1 Reactor, 3 x 20 MVAR	-	-	-